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CLASSIFICATION OF NON-INFECTIVE ENLARGEMENT OF LYMPH NODES*

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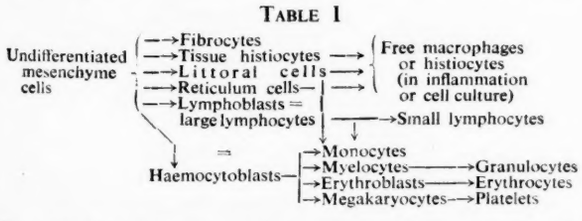
In dealing with the "non-infective" enlargement of the lymph nodes it is necessary that uniformity of description and terminology should be arrived at by all pathologists on whom the onus of biopsy diagnosis rests. The reaction of various conditions to therapeutic measures cannot be pronounced with certainty until we are sure that similar conditions are being compared, nor can any prognosis be made until a considerable number of adequately diagnosed and classified conditions have been treated and the results assessed. In this paper a classification is put forward based on the cytology of the lymph gland, and the clinical conditions represented by the various groups are summarized so far as they are at present established.

Structure of Lymph Glands

According to the views of Maximow (1927), in the lymphatic glands and lymphadenoid tissue generally, and in the bone marrow, the same fundamental structure is present. This consists of a framework of argyrophil recticulin fibrils, closely associated with which is an undifferentiated syncytium. In the meshes are located the immature and maturing free cells of the blood. The undifferentiated syncytium is mesenchymal in its nature and is capable of differentiating along various lines (Table I).

TABLE I



The reticular syncytium does not perform any metabolic function, is not phagocytic in character, and does not store vital dyes. Under stimulation, reticulum cells are formed from the reticular syncytium. These are large oval or stellate cells, with an oval vesicular nucleus; a well-defined nucleolus is present. They still possess unrestricted potentialities for differentiation, and may be phagocytic and store vital dyes. Similar cells are found in connective tissues near the blood vessels.

The venous sinuses of the splenic pulp and bone marrow, and the lymphatic sinuses in the lymph glands, are lined by specially differentiated reticulum cells (sinus reticulum, or littoral cells). The stellate cells of von Kupffer in the liver are of this nature. Littoral cells are phagocytic in character and, under stimulation, differentiate to the actively phagocytic free histiocytes.

In the bone marrow the undifferentiated tissue gives rise at first to a primitive free cell, which was called the haemocytoblast by Ferrata. This cell may differentiate along various lines—to the monocyte, the myelocyte, the erythroblast, or the megakaryocyte. Maximow regards the haemocytoblast as similar in every way to the large lymphocyte of the lymphatic tissue—that is, the lymphoblast. This large lymphocyte (lymphoblast) arises normally from the reticulum cells in the lymphatic tissue. It does not enter the blood. It gives rise to the medium-sized lymphocyte, and that in turn, by mitosis, gives rise to the small lymphocyte. The medium-sized lymphocyte of the lymphatic tissue is the large lymphocyte of the peripheral blood stream. The plasma cell arises by alteration of the lymphocyte.

Another line of differentiation which has its origin through the reticulum cell results in the formation of the fibrocyte, and collagen fibres are thus produced. Normally reticulin fibres are produced by the reticular syncytium and its derivatives. Under pathological conditions a somewhat specialized reticulin-forming cell, the dictyocyte, becomes recognizable. It is a polygonal cell with cytoplasmic projections, which may be in contact with projections from adjacent cells. It is specially important in the discussion of the neoplasms of the lymph nodes.

The point which I wish to emphasize is this: There is, in the haemopoietic tissue and elsewhere, a common ancestral or stem-cell type which, given appropriate stimulus, may differentiate along any of the lines of development shown in the table. The appropriate stimulus, in a normal human adult, for the development of the myelocyte is present in the bone marrow; the appropriate stimulus for the development of the small lymphocyte is present in the lymphadenoid tissue. Under abnormal conditions there may be action of such stimulus in abnormal situations; or an abnormal stimulus may cause overproduction of any of the cell types, or abnormal combinations of cell types. This means that the tissue changes, in myeloid and lymphatic leukaemia, for instance, are not due to a fundamental difference in two tissue elements, but to the action of a different stimulus on a common

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stem-cell. In the normal adult tissue of a human the development of this stem-cell into free blood cells rarely happens, except, possibly, in lymphatic tissue. This development does, however, become apparent in certain diseases.

Before going on to the classification of the diseases of the lymph glands, it remains to summarize the occurrence of these tissue elements in the lymph nodes. The reticulin fibrils in the medulla of the lymph node form a meshwork which supports the undifferentiated syncytium. The derivatives of the syncytium—reticulum cells, lymphocytes of all sizes, and histiocytes—lie in the meshes. At the margin of sinuses there is some condensation of these reticulin fibrils, and some cross the lumen of the sinus and are continuous with the capsule. These fibres serve as a support for the littoral cells. The follicles contain few reticulin fibrils, if any, the reticular syncytium acting as a supporting stroma for the large, medium, and small lymphocytes.

Classification

The non-infective enlargements of the lymph nodes are essentially hyperplasias, or neoplasms, of the reticulum or its derivative cells. The term "reticulosis" should be used for those diseases in which there is systematized hyperplasia of differentiated or undifferentiated mesenchymal cells, leading to generalized enlargement of the lymph nodes, the spleen, and the liver, with alteration of the bone marrow. This idea of cytological classification is an old one. MacCallum in his textbook gives it as his opinion that "if we knew accurately all the cellular types existent in the bone marrow and in the lymphoid tissue, and assumed that each is capable of undergoing independent hyperplasia, we should be able to tabulate all the possible diseases arising in this way." The recently acquired knowledge of the existence of the undifferentiated mesenchymal cell and its capacity for differentiation enables us to go a long way further in classification.

We may now assume that the unknown factor stimulating hyperplasia of any cell elements does not necessarily inhibit differentiation of that cell, although it may be regarded as determining the line or lines of differentiation which the hyperplastic cell may follow. The classification now proposed assumes that any one of the unknown aetiological factors will act on medulla or follicle or sinus, since such special site of action has been established for the known aetiological agents producing changes in the lymphatic glands (syphilis, etc.).

TABLE II.—*Non-infective Enlargements of Lymph Nodes*

(1) Reticulosis—hyperplasia of differentiated or undifferentiated mesenchyma
- A: Medullary reticulosis:
  - (i) Primary:
    - (*a*) Undifferentiated. (*b*) Haemic (leukaemias). (*c*) Fibromyeloid (lymphadenoma). (*d*) Histiocytic.
  - (ii) Metabolic; generalized lipoidosis:
    - (*a*) Gaucher's disease. (*b*) Niemann-Pick disease. (*c*) Primary xanthomatosis.
- B: Follicular reticulosis:
  - (*a*) Lymphoid. (*b*) Fibrillary.
- C: Sinus reticulosis:
  - (*a*) Acute. (*b*) Chronic.

(2) Primary neoplasms—reticulosarcoma

In medullary reticulosis the proliferating cells arise in the medulla of the lymph gland, spleen, and bone marrow. In follicular reticulosis the follicles of the lymph gland are affected and the proliferating cells have a follicular arrangement. In sinus reticulosis hyperplasia affects the littoral cells lining the lymphatic sinuses of the lymph glands and the venous sinuses of the liver, spleen, and bone marrow. Subdivisions can then be made in these groups according to the types of cells produced. Some of the groups given in Table II can be further subdivided. For instance, the haemic medullary reticuloses are the leukaemias (or leucoses), myeloid or lymphatic or monocytic. Possibly, according to some opinions, the more accurate position for monocytic leukaemia would be in the sinus reticulosis group; this is a matter on which more knowledge is badly needed.

Having outlined the classification of the diseases affecting the haemopoietic organs, it remains to provide a clinical picture of each type and briefly to indicate the changes found in the lymph nodes.

Undifferentiated Medullary Reticulosis

It may be taken as a rule that where there is little differentiation of the primitive cells the clinical picture is an acute one. This type of reticulosis is an acute disease affecting children. The course averages about six weeks. The symptoms are typhoid-like. There is generalized enlargement of the lymph glands, splenomegaly, and hepatomegaly. The intestinal lymphoid tissue may be affected. The predominating cell in the enlarged gland is the reticulum cell. Sometimes fibrils are formed, but phagocytosis is not present. Roussy and Oberling (1934) described about sixteen cases. A similar disease occurs in adults, but is very rare. In adults the course tends to be subacute.

Haemic Medullary Reticulosis

This group includes the myeloid, lymphocytic, and monocytic leukaemias, or leucoses. Chronic and acute myeloid leukaemia need not detain us. In myeloid leucoses the hyperplasia seems to affect cells which have already become differentiated and can only differentiate to more adult members of the granulocyte series. As a rule, in this condition there is no evidence of any reticular hyperplasia in the lymphatic gland. In lymphatic leukaemia there is, however, evidence in nearly all cases of hyperplasia of cells without a fixed line of differentiation—that is, hyperplasia of the reticulum cells. The following case illustrates this in a most striking degree. In other cases lesser degrees have always been found on careful examination of the lymph glands.

CASE I

This patient, a man aged 57, was admitted to hospital with a history of enlarged glands of the neck, axillae, and groins for three years, necessitating periodic rests from work. Two and a half years before admission a white blood count showed 60,400 cells, with 92 per cent. of lymphocytes; a gland removed at biopsy was said to be typical of lymphatic leukaemia. On admission the white cells of the peripheral blood stream were all of a primitive type—oxidase-negative non-granular cells (see Table III). There was pleural effusion, and the liver and spleen were enlarged. Later, after prolonged *x*-ray treatment, the cells were for the most part small lymphocytes. At necropsy the mediastinal, cervical, abdominal, and inguinal glands were all enlarged. The liver was large, weighing 2,041 grammes. The spleen weighed 1,415 grammes, and showed very large grey Malpighian bodies in a reddish pulp. Microscopically, adult lymphocytes were present in the pulp. The Malpighian bodies were normal but large. Microscopically, some glands were packed with small lymphocytes, with obliteration of the normal architecture; others showed reticulum hyperplasia with development of fibre-bearing cells, and giant cells with twin mirror-image nuclei were present. One of the points of interest in this case is that before the post-mortem histological examination there

was no reason to suspect that the blood count, so typical of lymphatic leukaemia, did not give an accurate indication of the underlying tissue changes.

TABLE III

1936	R.B.C. (1,000's)	Hb %	W.B.C.	P.	Degen. Cells	Primitive Oxid. neg.	Lymph.
Feb. 15	3,200	52	700,000	0.5	36.0	63.5	—
„ 26	3,100	52	438,000	3.0	36.5	60.5	—
„ 27	3,260	54	500,000	2.0	40.5	57.5	—
Mar. 3	3,250	52	408,000	1.0	46.0	53.0	—
„ 6	3,080	56	345,000	2.0	27.0	66.0	8.0
„ 9	3,030	54	286,000	2.0	35.0	53.0	10.0
„ 12	3,340	54	260,000	3.5	—	12.5	83.5
„ 17	3,500	58	238,000	4.0	3.0	2.5	89.5
„ 19	3,270	58	225,000	3.0	2.0	2.0	93.0

Treatment: Deep *x*-ray to spleen and chest. Frequent paracentesis.

There is some confusion in the literature of monocytic leukaemia as to the histological changes in the lymph gland and other organs, and at the present time it is not possible to formulate any opinion as to the true position of this disease. I have no personal experience of a true monocytic leukaemia. In a case of acute leukaemia with 10,500 white blood corpuscles per c.mm. 32 per cent. by vital staining were true monocytes and 41 per cent. small lymphocytes. The sternal puncture showed adult small lymphocytes. The case was diagnosed as acute mixed leukaemia, and the lymph glands showed hyperplasia of the sinus reticulum as well as medullary hyperplasia.

Fibromyeloid Medullary Reticulosis

This is the correct term in the suggested classification for that disease so long known as lymphadenoma or Hodgkin's disease. It is the best known of the primary reticuloses except those of the haemic group, and the clinical picture is well defined. The course is chronic. It is longer in duration than other reticuloses, with the possible exception of follicular reticulosis and Gaucher's disease. The lymph nodes in the cervical region are affected first as a rule, and the enlargement then spreads to the other groups. Splenomegaly occurs in about 70 per cent. of the cases; it is moderate and not constant. Massive involvement of the lung may occur in some cases.

The characteristic changes in the glands in fibromyeloid reticulosis are the proliferation and differentiation of the reticular syncytium. These changes have been described in great detail by Pullinger. The changes in the reticular syncytium and the cells derived from it may be summarized as follows:

The nucleus becomes enlarged and the cytoplasm becomes partially separated. The swollen cells then separate out as individuals. The cells may show vacuolation and retraction of the cytoplasmic processes, and groups of cells may be seen showing ill-defined cell boundaries with large nuclei, perhaps twin. Cells appear with well-defined twin nuclei, which in characteristic Sternberg-Read giant cells are mirror images of one another. These giant cells are often seen in Hodgkin's disease.

The characteristic of lymphadenoma is, however, differentiation of the cells; a filigree of reticulin fibrils is present, and granular cells, many of them eosinophils, are developed from the reticulum cells, a considerable diversity of cell structure resulting. In late stages the production of collagen may give rise to a very dense fibrous tissue with only a few reticulum cells remaining.

Histiocytic Medullary Reticulosis

Histiocytic medullary reticulosis is a condition which has probably been classified as "atypical Hodgkin's disease." Pullinger described a case in 1932. The glandular lesion was characterized by areas of haemorrhage and necrosis. Macrophages were present, with chromatin particles and, frequently, red blood corpuscles in their cytoplasm. Giant cells having small nuclei arranged at the periphery were also present. Occasionally reticulum cells with twin nuclei were seen. Cells with eosinophilic cytoplasm and darkly staining nuclei were abundant. Some of these showed mitotic figures. (These cells have been termed prohistiocytes by Robb-Smith, 1938.) Bodley Scott and Robb-Smith (1936) have included this case with three others in a paper on histiocytic medullary reticulosis. These authors have been able to find six other cases in the literature and to assign a clinical picture to the condition. Briefly, the clinical course is characterized by fever, wasting, generalized glandular enlargement, splenomegaly, and hepatic enlargement. Jaundice, purpura, and anaemia with leucopenia are common in the final stages. The average duration of the disease is fifteen weeks, all cases ending fatally.

Generalized Lipoid Histiocytosis

Gaucher's disease is familial, the average duration being about forty-five years. The condition is characterized by great splenic enlargement, and although there may be generalized enlargement of the glands it would be unusual for diagnosis to rest on the biopsy of a gland. It is not always realized that patients suffering from Gaucher's disease may live for "three-score years and ten" and die of the cerebral complication of atherosclerosis so common to the old without the metabolic disturbance being of clinical significance.

Follicular Reticulosis

Follicular reticulosis of the lymphoid type has been described by Brill, Baehr, and Rosenthal (1925) in America as follicular lymphoblastoma. It is a disease affecting adults, the average age being from 43 onwards. The course is typically remittent, lasting for four or five years. There is splenomegaly and enlargement of the lymph glands. The disease is characterized by serous effusion, and hypochromic anaemia is fairly constant. The clinical picture in some cases is that of hepatic cirrhosis with splenomegaly. Other cases, however, give the clinical picture of "splenic anaemia" with leucopenia and relative lymphocytosis. The lymph glands show on the cut surface numerous small white nodules. These are enlarged follicles, consisting of large lymphocytes. There is no reticulin increase, and occasional reticulum cells are present. In all about forty-five cases of the disease have been described. The American writers state that the condition responds well to irradiation.

CASE II

This case was diagnosed in life as reticulosis. The patient, a woman aged 58, was admitted for swelling in the abdomen. There was a ten-weeks' history of listlessness, dyspnoea on exertion, and swelling of the ankles. For six weeks there was enlargement of the abdomen with ascites, which was tapped, and at the onset constipation was present. She was admitted on May 24, 1938, and died on June 22, being under observation for four weeks. On admission the spleen was down to the umbilicus and the liver palpable. Glands were palpable in the axillae and groins. Paracentesis was performed on two occasions, 16 pints and 18½ pints of milky fluid being withdrawn. This was sterile and contained no fat. A blood

count showed: red cells, 5,160,000 per c.mm.; haemoglobin, 92 per cent.; white cells, 6,600 per c.mm.—75 per cent. polymorphis, 0.5 per cent. basophils, 0.5 per cent. eosinophils, 22 per cent. lymphocytes, 4 per cent. monocytes.

Post-mortem Examination.—There was oedema of the larynx, and ten pints or more of turbid fluid were present in the left pleural cavity. The lungs were collapsed at the base; the abdomen contained twenty pints or upwards of turbid fluid; the liver weighed 2,280 grammes and was firm and pale. The spleen weighed 1,120 grammes, was 22 cm. long, was dull pink with a thick capsule, and its cut surface was studded with white nodules. The lymph glands were all enlarged, were white, soft, and discrete, and numerous punctate white areas were present on the cut surface. The bone marrow showed similar small white nodules. Microscopical changes in the lymph nodes were recorded thus: "The white areas are the lymphoid follicles much enlarged. They consist of large lymphocytes, with occasional reticulum cells. There is no increase of reticulin fibrils in the follicles." This case was similar in many ways to one described by me in 1933.

CASE III

This patient, a Post Office worker, was under observation for five years. The onset of disease, with swelling of the glands in the groin, occurred when he was 43; later the glands in the axilla became enlarged. At the age of 47 he was admitted to hospital. He then had dental sepsis with ulceration of palate. The Wassermann reaction was negative. There was proptosis of the left eye, and enlarged glands were present about the left orbit and in the left cervical region. A biopsy on one of the cervical glands at this time showed follicular lymphoid reticulosis, with follicles consisting almost entirely of adult small lymphocytes. These glands disappeared under *x*-ray treatment. A blood count showed: 3,930,000 red cells per c.mm.; 68 per cent. haemoglobin; and 4,200 leucocytes, 74 per cent. being polymorphs, 2 per cent. basophils, 1 per cent. eosinophils, 4 per cent. monocytes, and 19 per cent. small lymphocytes. There was a recurrent enlargement of glands for a period of three years. As new groups of glands became enlarged and interfered with his work, *x*-ray treatment was given, the enlargement then subsiding. Three months before death he was admitted with generalized glandular enlargement and a cough. Death resulted from confluent bronchopneumonia with empyema.

Necropsy.—There was generalized enlargement of the lymph glands, and also a mass in the abdomen pressing on the right renal pelvis, causing hydronephrosis. The spleen was large, with a normal pattern. The glands showed small white nodules studded over the cut surface. Microscopically the glands revealed lymphoid follicular reticulosis, and in some of them there were adult and small lymphocytes in the follicles, as had been found in the biopsy material two years previously. In the mass in the abdomen the follicles consisted of large lymphocytes, and reticulum cells were also present. The feature of this case was the extraordinary sensitivity to *x* rays, whereby the disease was checked but not arrested. This was like a case of lymphadenoma, in that the one group of glands enlarged first, and the enlargement then took place in another group. The glandular enlargement was not generalized from the onset.

I believe that similar cases have in the past been regarded as radiosensitive Hodgkin's disease, and that this type of lymphoid follicular reticulosis in a clear-cut clinical entity.

Fibrillary Follicular Reticulosis

This disease is similar to lymphoid follicular reticulosis, but is evidently more rare. It occurs in adults. I described a case in a woman of 61 who was admitted to hospital with a diagnosis of hepatic cirrhosis with splenomegaly and generalized glandular enlargement. There had been recurrent ascites for eighteen months. The blood count was: red cells, 3,770,000; haemoglobin, 50 per cent.; leucocytes, 6,000, 47 per cent. being polymorphs, 5 per cent. monocytes, and 48 per cent. lymphocytes. The lymphatic glands, on naked-eye examination, showed numerous small white nodules. Microscopically these white nodules consisted of irregularly shaped reticulum cells with occasional binucleate forms. A great increase in reticulin fibrils was present in these follicles.

Primary Sinus Reticulosis

This group includes hyperplasia of sinus-lining or littoral cells. An acute type, running a clinical course of great rapidity, with jaundice and increasing anaemia, has been described by Debenedetti and Florentin (1931). It affects adults. The spleen and liver are enlarged, and in the lymphatic glands and elsewhere there is phagocytosis of the red blood corpuscles by the proliferating sinus-lining reticulum cells. Pryce and Reburn have described a similar case in this country.

There was also a chronic type which was originally described as occurring in the spleen (Stengel; Wolbach, 1911). When the lymph glands are affected the normal architecture of the gland is entirely destroyed: circular foci of cellular proliferation surrounded by a zone of peripheral fibrous tissue are scattered throughout the whole gland. The centre of each focus consists of proliferating cells of the histiocyte type, usually with one or more giant cells of the Langhans type. Occasionally the giant cells contain cytoplasmic inclusions. Necrosis has never been observed. Reticulin fibrils and collagen fibrils run in between the cells, as well as encircling the nodules, and fibrosis of the entire nodule results. The aetiology is quite unknown.

Conclusion

This concludes my survey of some of the conditions in which reticular hyperplasia is the underlying tissue change. I hope I have made it clear that well-defined clinical entities are represented by some of the groups into which the conditions have been classified. Cases of lymphadenoma, or Hodgkin's disease, lymphoid follicular reticulosis, myeloid leukaemia, histiocytic medullary reticulosis, Gaucher's disease, and some others fall into their correct position when the tissue changes in a lymph gland are subjected to careful analysis, and the clinical characteristics of other groups should be recognized as our knowledge of the reticular hyperplasias increases. The future should enable us to assign most conditions to their correct classes, but meanwhile the careful examination of lymph gland and bone marrow (preferably before treatment is begun) must take a prominent position in the diagnostic investigation of all cases.

It must be remembered that the ultimate object of classification is (1) to assist in the search for an aetiological factor, and (2) to provide a basis for information as to prognosis and the result of treatment. No real advance can be made until a definite cytological examination is carried out before treatment is begun.

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THE VALUE OF THERAPEUTIC MEASURES IN DUODENAL ULCERATION

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The number of methods recommended for the treatment of peptic ulcer is in itself an indication that there is no specific therapeutic measure for this condition. Treatment, however, whether medical or surgical, is designed to diminish the hyperchlorhydria which is almost always present. To achieve this end elaborate dietetic systems have been evolved, among which may be instanced the Sippy and Lenhartz regimes and their many modifications. Considerable claims have been made for all these methods, and much success has accompanied their use, but none of them has given invariably successful results. It has indeed been questioned whether equally good results may not be achieved without these meticulous dietetic and medical measures, simply by putting the patient to bed and feeding him at regular intervals with a bland light diet. Diminished gastric acidity has often been regarded as an essential to symptomatic improvement and as an important factor in the healing of peptic ulcers, but it has nevertheless been noted (Moore, 1938) that hyperchlorhydria may remain or may even become more intense while healing is taking place, with symptoms in abeyance.

It has thus seemed worth while to attempt to determine: (*a*) whether it is possible to control a severe degree of hyperchlorhydria throughout the day by the methods commonly adopted, and (*b*) whether such control, if attainable, is an essential to symptomatic improvement and to the healing of the ulcer. With a view to determining these points, sixty persons were investigated, fifteen of whom were healthy control subjects, free from symptoms and having presumably normal gastric function. The remaining forty-five cases were suffering from duodenal ulceration and hyperchlorhydria, the presence of ulceration having been confirmed radiologically.

Method of Investigation

The patients were divided into groups (see table) and three different methods of treatment adopted—namely, light hospital diet (the meals being given at regular and rather frequent intervals and without any drugs), a Sippy regime with alkalis, and a Sippy regime with magnesium trisilicate (magsorbent). The cases were treated in bed. Following a full routine examination an ordinary fractional test meal was carried out and the presence of hyperchlorhydria confirmed. Treatment was then instituted, and on the following day a Ryle's tube was again passed and a specimen of gastric contents obtained every hour for a period of twelve hours, the specimens being withdrawn midway between the taking of food or drug. This "long test meal" was repeated at the beginning of the third week. The urinary *p*H of the patients having alkalis was determined morning and evening by means of B.D.H. universal indicator, and the blood urea and the carbon dioxide combining power of the blood (van Slyke method) were estimated every few days. The Ryle's tube was left *in situ* for the whole period unless the patient preferred to re-swallow it hourly. Analysis of the gastric contents was carried out in the usual manner.

Table showing the Number of Cases in Each Group

Group	Treatment	Ulcer Cases	Healthy Controls
A	Light diet (no drugs)	15	5
B	Sippy diet (with alkalis)	15	5
C	Sippy diet (with magsorbent) ..	15	5

In employing this type of test in the present series certain admittedly artificial criteria have been adopted. It has been assumed that a free acidity of 40 clinical units represent the upper limit of normal (Vanzant *et al.*, 1932) and that acidity above this level represents hyperchlorhydria. Cases were therefore considered to be "controlled" if the free acidity did not exceed 40 oftener than twice in twelve hours, and then not in consecutive specimens. A case was regarded as "partially controlled" if the free acidity reached 40 on not more than three non-consecutive occasions, one of these being in the fasting juice. If these criteria were not satisfied the case was considered to be "not controlled."

Results

Group A.—In this group the healthy subjects showed a comparatively low level of free acid throughout the day, with slight fluctuations from hour to hour. The taking of food had little effect on the acid level. Very different results were noted in the ulcer cases. The hyperchlorhydria was pronounced throughout the day, and in only one case was "control" obtained. In several cases, on the other hand, the hyperchlorhydria became more severe. Clinically, however, these cases improved rapidly and became symptom-free. It was difficult to decide whether healing of the ulcer was taking place in the presence of the severe hyperchlorhydria, but in view of the disappearance of subjective and objective signs, and the fact that no relapse has occurred after a year, it seems likely that this was the case.

Group B.—In the healthy subjects in this group a low acid level obtained throughout the twelve hours, but in no case did complete neutralization occur. Sippy himself stated that "control (that is, absence of free hydrochloric acid) should be maintained from the beginning of treatment," but in the present investigation this was never obtained in either the normal or the hyperchlorhydric case. Of the fifteen hyperchlorhydric cases six were "controlled" and four "partially controlled." It was noted, however, that there was no method of distinguishing clinically between "controlled," "partially controlled," and "not controlled" cases. In the cases "not controlled" within the first two days no "control" was obtained after three weeks' therapy, nor did any significant variation occur in their acid curves. A similar observation was made in the "partially controlled" cases, in which no further alteration of acid level resulted from therapy. It would appear that if "control" is not obtained within the first few days no further modification of acid secretion can be expected by prolonged treatment. In none of these cases on massive alkali therapy did alkalosis develop. This complication was noted by Hardt and Rivers (1923) in some of Sippy's own cases, and has since received considerable attention (Cooke, 1932; Oakley, 1935). The alkali reserve and the blood urea tended to rise slightly during treatment, but they always remained well within normal limits, and no signs of alkalosis were noted clinically or by routine tests. Relief from symptoms was satisfactory in all cases, and there has not been a relapse during the past year.

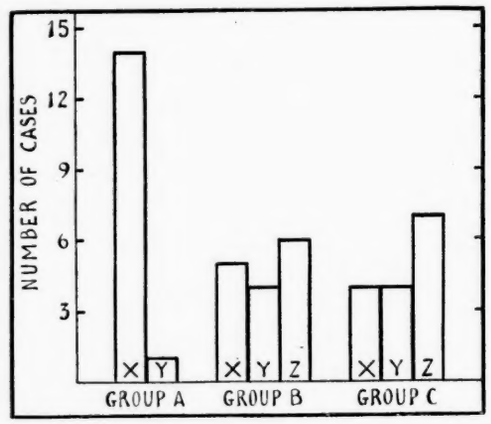
Group C.—The findings in this group were similar to those obtained in Group B. In the healthy subjects the degree of neutralization obtained was slightly less than in the analogous series in Group B. Of the hyperchlorhydric cases, seven were "controlled" and four "partially controlled." Complete neutralization was not effected either in the normal or in the hyperchlorhydric cases, and it was again impossible on clinical grounds to discriminate between the different grades of "control." No special advantage was noted in favour of magnesium trisilicate as compared with alkalis, although a slightly larger number of cases were "controlled" in this group. In cases in which the acid level was modified during the first few days no further modification took place after some weeks of treatment, and cases in which the acid curve was not affected during the first few days showed no significant alteration at a later date. All cases, however, showed rapid clinical improvement and became symptom-free: one case has since relapsed owing to a marked dietetic indiscretion, but the other cases have shown satisfactory progress over a period of one year.

Discussion

Many observers have indicated the disadvantages of the "short" test meal, and it seems probable that the "long" meal offers a better evaluation of gastric function, as the patient is proceeding with his ordinary occupations of the moment and becomes thoroughly accustomed to the procedure. The method has not as yet been widely employed, though among others who have made use of it may be mentioned Wosika and Emery (1936) and Mann (1937). Bengt Ihre (1938) has utilized it in an extensive investigation, using a Lagerlof-Agren tube and a special technique.

Hellbrandt and his colleagues (1936) showed that there was considerable variation in the composition of gastric juice examined at different periods of the day, and that the acidity often exceeded that demonstrable during an ordinary fractional test meal. These observations were confirmed in the present investigation, and it was further observed that the acid-level fluctuations occurring throughout the day in the healthy subject were surprisingly little affected by the taking of food or drugs, or by alterations in the type of food taken. Complete neutralization of free acid was never obtained, and there was considerable variation from hour to hour. The variations were slight in comparison to the fluctuations seen in the hyperchlorhydric cases, however, the latter showing very pronounced and unpredictable alteration from low to high acidity and vice versa. This alteration was unaccompanied by symptoms or clinical signs. The effect of diet and drugs in diminishing the height and duration of such spells of hypersecretion varied in individual patients, the acid level in some cases being considerably affected, and in others not at all. The graph indicates the relative degrees of "control" obtained by the different methods.

Although the cases were carefully studied, it was not found possible to correlate the variations in acid level with the symptoms and signs or with variations in these. The cases reacted similarly, irrespective of the treatment adopted, in that symptoms disappeared within a few days. Signs such as tenderness or rigidity took longer to disappear, but were absent in all cases by the end of ten to fourteen days. This improvement took place whether the acidity was diminished, unaltered, or increased, and clinically there was no indication as to whether or not the acidity had altered. Although twice as many cases on the diet–drug regime were "controlled" as those on light diet alone, the progress of both series has been similar, and there has been no relapse, during a period of one year, except in one case. To achieve "control" if possible seems physiologically sound, but these facts suggest that such "control" is not essential to the healing of the ulcer.



Graph showing results of treatment in hyperchlorhydric cases. X = "not controlled," Y = "partially controlled," Z = "controlled" cases.

Current research shows that there are factors other than hyperacidity concerned in the production of peptic ulceration, and the view that too much attention can be devoted to the local lesion is beginning to gain ground.

Summary and Conclusions

A series of cases of hyperchlorhydria associated with duodenal ulceration has been investigated, and it is noted that:

1. The hyperchlorhydria is but little modified by light diet without drugs, but symptoms are relieved.

2. The hyperchlorhydria is significantly modified by a Sippy regime.

3. No special advantage is noted in the use of magnesium trisilicate as compared with alkalis.

4. In the absence of vomiting, the risks of alkalosis developing during alkali therapy are slight.

5. No distinction can be drawn on clinical grounds between cases in which hyperchlorhydria during treatment is or is not altered.

6. Healing of a peptic ulcer and relief of symptoms can take place although the hyperchlorhydria is unaltered or even becomes more severe.

7. The "long test meal," lasting at least twelve hours, is of considerable value in the investigation of gastric function and the assessment of the effect of different agents upon secretion.

It is a pleasure to express my thanks to Professor D. M. Dunlop and Dr. A. M. Scott for advice and criticism.

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ESTIMATION OF BLOOD SUGAR BY THE PRACTITIONER

A MODIFICATION OF FOLIN AND WU'S METHOD

BY

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The need for a quick, easy, and inexpensive method of blood-sugar estimation has long been felt by a large number of doctors in their own practices and at the smaller hospitals where no laboratory facilities are present. Usually the difficulty has been either the expense of a colorimeter or the tedious checking of solutions and the liability to error in the titration methods.

Folin and Wu's method is a colorimetric estimation which for greatest accuracy demands the use of a colorimeter, but I have found that a simple dilution of the final colours in specially calibrated tubes and comparison by the naked eye gives results within ±10 mg. of the more precise colorimeter reading; this is accurate enough for all clinical purposes. The results shown below are duplicated estimations, one being obtained by the original Folin-Wu method, using the colorimeter, and the other by the means here described.

Folin and Wu's Mg.	Dilution Method Mg.	Folin and Wu's Mg.	Dilution Method Mg.
172	180	126	130
98	100	178	180
208	220	200	190
169	180	325	320
250	240	189	200
88	90	187	180
86	95	194	190
149	160	111	120
73	80	400	400
303	280	260	250
152	160	72	80
104	120	95	97
170	160	317	320
136	145	212	205
261	260	303	300
175	170	303	300
196	200	130	130
106	107	104	100
95	95	168	167
143	147	114	115
87	85	246	238
237	230	253	260
172	158	176	167
200	198	168	175
144	147	206	205

It will be seen that of these fifty duplicated estimations twenty-three have a difference of less than 5 mg., sixteen of 5 to 10 mg., nine of 10 to 15 mg., one of 15 to 20 mg., and one exceeding 20 mg. Twenty of these estimations were also duplicated entirely by the modified method; of these eight have no difference, eight have a difference of 5 mg., and four a difference of 10 mg.

Description of Apparatus

The method has been designed to enable estimations to be done with the minimum of technical knowledge and laboratory experience. Thus the solutions, which are the same as those used in the original method, are placed in order of use from left to right in a specially arranged box which has a handle on top and is easily portable. Each bottle contains its own pipette of automatic design, and the necessary tubes are calibrated to requirements. The solutions remain stable for many months, and accuracy with the standard glucose is ensured by putting the required amount in a small sealed ampoule. The comparison tubes in which the dilution of the final colour is made are calibrated to show the actual blood-sugar reading in milligrammes per 100 c.cm. at the point where the two colours match after dilution. The complete apparatus, with solutions sufficient for thirty-six separate estimations, can be obtained from Messrs. Baird and Tatlock (London), Ltd., 14–17, St. Cross Street, Hatton Garden, E.C.1.

Directions for Use

Blood.—Into a tube marked A place water (see Note 8) up to the mark (3.5 c.cm.). Collect blood into the 0.1 c.cm. blood pipette up to the mark by pricking the ear or finger or from venous blood, and wash this into the water in tube A by sucking the water up and down until the pipette is quite clean. Add to this 0.2 c.cm. sulphuric acid solution, shake, and add 0.2 c.cm. sodium tungstate solution. Mix thoroughly by gentle shaking. Place a filter paper and funnel in tube B and filter into this the solution from tube A. When filtration is complete take 2 c.cm. of the filtrate by means of the pipette marked F and put into tube C (marked at 12.5 c.cm.). To this add 2 c.cm. Folin copper solution, shake gently to mix, and place a capillary stopper in the top of the tube.

Standard.—Into tube S1 put a standard ampoule. Break this on the bottom of the test-tube by means of the glass rod provided. Do not remove the rod, but hold it above the water-line and add water up to the mark on the test-tube, and to this add 0.4 c.cm. sulphuric acid and 0.4 c.cm. sodium tungstate (0.2 c.cm. twice). Shake thoroughly to mix, holding the glass rod on to the side of the test-tube.

When thoroughly mixed, wash the filtrate pipette by taking 2 c.cm. of the solution and discarding. Take another 2 c.cm. and put into tube S2 together with 2 c.cm. of Folin copper solution. Shake to mix, and place a capillary stopper in the top of the tube. Place both tubes (C and S2) in a water bath or small saucepan of *boiling* water and leave for six minutes. The water bath or saucepan must be small enough to allow the tubes to stand so that their tops are well out of the water. Cool the tubes for two minutes in cold water and then add to each 2 c.cm. of phosphomolybdic acid solution. Shake gently until there is no more frothing. Add water up to the mark and mix by inverting on the *clean* thumb. Into the comparison tube marked S pour the standard solution from tube S2 up to the 100 mg. mark, and into the comparison tube marked U pour the solution from tube C also up to the 100 mg. mark. Dilute the stronger coloured solution with water until the colours match. Mix by inverting on the thumb after each addition of water. The result of the estimation is marked on the tube at the point where the dilution is completed.

Notes

1. Background for Matching Colours.—A good method is to stand with the light coming from behind, the tubes held up in front of the face with one hand and a piece of white paper held at an angle behind the tubes with the other.

2. A space of about ten seconds should be allowed to elapse after each addition of water before comparing the colours.

3. When the unknown colour is very much stronger than the standard, a first dilution may be made large enough to take the comparison to within 60 mg. or so of the standard colour. Thereafter it is advisable to add water at the rate of 10 to 20 mg. at a time.

4. Where doubt is felt as to the final colour match, take a reading, add another 10 mg. of water, and compare again. If the first reading was correct the second will be obviously weaker.

5. Automatic Pipettes.—These are designed to "deliver" the required volume, and as each solution has its own pipette the excess which pours over into the bulb may be put back into the bottle. Those contained in the bottles need not be cleaned. The filtrate pipette, however, should be washed with water and allowed to drain. It

should never be used wet, except when enough solution is available to allow of a first wash.

6. The Folin copper solution has a tendency to deposit cuprous oxide. This can be seen on the bottom of the bottle when present, and is orange-red in colour. The solution is kept in a dark bottle to prevent this; but if it occurs the solution must be decanted and the bottle washed and dried before the solution is returned.

7. Cleaning.—A good wash under running cold water, and draining, is all the cleaning necessary. Wash tube A before it has time to dry.

8. Ordinary tap-water is perfectly safe to use in making the estimations.

In evolving this method I am greatly indebted to Dr. R. D. Lawrence for his invaluable criticism and suggestions and for his kind permission to carry out the work in the diabetic clinic at King's College Hospital. I owe thanks to the whole staff of the clinic for their encouragement.

THE SEROLOGICAL GROUPS AND TYPES OF STREPTOCOCCI ISOLATED FROM EXCISED TONSILS

BY

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A survey of the serological types of haemolytic streptococci in Australia has been proceeding at these laboratories for the past year. The progress findings in respect of the streptococci isolated from scarlet fever patients in Melbourne and Adelaide, from puerperal and surgical infections, and from normal throats in Melbourne have already been reported (Keogh and Kelsey, 1939; Keogh, Macdonald, Battle, and Puckey, 1939). The strains found in scarlet fever patients were rarely isolated from normal throats or from patients with puerperal or surgical infections. This present study was undertaken primarily to discover whether the predominant serological types of streptococci encountered in the tonsils would be those commonly associated with scarlet fever or those commonly found in surgical infections and in the throats of healthy adults and children. The results, however, will be discussed not so much from that particular viewpoint as from their bearing on the much-debated question of the indications for tonsillectomy.

There have been numerous previous investigations of the bacterial flora of tonsils, most of them, however, undertaken before the introduction by Lancefield of the precipitin methods, which enable a distinction to be made between probable pathogens (Group A) and probable non-pathogens (not Group A) among strains of haemolytic streptococci. So far as we are aware, no study of the tonsillar flora using the finer analysis of identification of the type of strains by the slide agglutination method of Griffith has been carried out, though a similar line of inquiry is being pursued in Sydney at the present time.

Methods

The tonsils examined were removed at routine operations at the Children's Hospital, Melbourne, during last summer and autumn (November, 1938, to March, 1939). Immediately after excision they were put in sterile containers and placed in a refrigerator until the following morning. Both tonsils of each patient were minced up in a single tube of sterile broth, a drop of which was plated on neo-peptone blood agar. Subcultures into tryptic digest broth were made from the various colonial types of beta-haemolytic streptococci present on the plates. The broth tubes were incubated overnight at 30° C. and the deposit used for typing by Griffith's technique. Strains which failed to show specific agglutination with the type sera at our disposal were then allotted to their respective Lancefield groups, using the formamide method of Fuller (1938) for extraction of the group polysaccharide. Any strains which agglutinated with our Type 4 or Type 28 sera were also checked as to group, since we find that these sera may give apparently specific agglutination with strains belonging to Group B, C, or G. The sera used had already been employed in the classification of large numbers of strains, and included samples of the following Australian types not appearing in the Griffith series, provisionally named "Wade," "Stewart," "Hale," "Woodbury," "John," and "Alli," which had been isolated from surgical and puerperal infections.

Results

Haemolytic streptococci were isolated from 259 of 378 pairs of tonsils (68.5 per cent.). Sawers and Barrett (1933) found haemolytic streptococci in the crypts of 61 per cent. of tonsils examined by them in Sydney. The strains which we isolated belonged to the following groups (Lancefield): Group A, 189 (50 per cent.); Group B, 21 (5.5 per cent.); Group C, 33 (8.7 per cent.); Group G, 28 (7.4 per cent.). It will be noted that 271 strains were isolated from 259 tonsils; in twelve cases two different strains were present. In eleven instances one strain belonged to Group A, the other to either Group B, C, or G; in the remaining case two different serological types of Group A streptococci were isolated (Types 12 and "Alli"). This incidence of Group A strains in the tonsils is ten times higher than in the throats of healthy children and adults. The details are set out in Table I.

TABLE I

Source of Strains	Percentage from which Haemolytic Streptococci were Isolated	
	Group A	Groups B, C, G
378 tonsils removed at operation	50.0	21.7
466 throats of healthy adults and children	4.5	13.1

This comparative incidence of Group A and non-Group A strains in the throats of healthy subjects agrees with the findings of workers in other countries. Hare (1935) estimated that in England about 7 per cent. of the general population carry Group A streptococci and 13 per cent. other groups. Davis and Guzdar (1936) found a carrier rate of 3 per cent. of Group A streptococci and 6.4 per cent. of non-Group A streptococci in healthy Chinese. Our figures in the healthy group for Groups B, C, G (13.1 per cent.) may be high, owing to the inclusion of a number of children from an institution many of whom were carriers of a Group C strain. The objection may be raised that this very high incidence of the potentially pathogenic

Group A strains is due to a greater *a priori* probability of isolating haemolytic streptococci from the excised tonsil than from a throat swab. But since there is no statistically significant difference in the percentages of non-Group A strains recovered from both sources, this factor cannot entirely account for the discrepancy. Further evidence against this assumption is provided by the fact that if haemolytic streptococci were present in the tonsils they were usually the predominant organism and were frequently obtained in practically pure culture. The data are shown in Table II.

TABLE II.—*Percentage of Haemolytic Streptococci in Bacterial Flora of Excised Tonsils (excluding 12 Tonsils which contained Two Strains each)*

Percentage of Colonies of Haemolytic Streptococci to Total Colonies per Plate	Group A Strains	Non-A Strains	Total
Less than 10	30 (17.1%)	14 (19.7%)	44 (17.8%)
10 to 50	37 (21.0%)	10 (14.1%)	47 (19.0%)
50 to 90	50 (18.4%)	18 (25.4%)	68 (27.5%)
90 to 100	59 (33.5%)	39 (40.8%)	88 (35.6%)

It will be seen that colonies of haemolytic streptococci predominated in the plates from 63 per cent. of these infected tonsils, and were practically the only colonies present in 36 per cent. of them. It is improbable that throat swabs taken by an experienced paediatrician or otorhinologist, as were all in our "normal" series, would have failed to disclose the presence of streptococci in tonsils harbouring them in such numbers. Tonsils from which either the predominant scarlatinal strains (2, 17, "Wade") or non-scarlatinal strains (6, 27, "Stewart") were isolated showed no significant differences in the intensity of infection when these two groups were compared with each other or with the group of tonsils infected by other types. Taken at their face value the results reveal that, as a group, children coming up for tonsillectomy at the Children's Hospital, Melbourne, show a significant and large increase in the incidence of pathogenic streptococci in their tonsils, but no significant increase in the incidence of the doubtfully pathogenic non-Group A strains.

Of the 189 Group A strains isolated from the tonsils, 143 (75.6 per cent.) were identifiable by the type sera at our disposal. The distribution of types was as follows:

Type	No.	Type	No.
6	38	"Coleman"	4
"Stewart"	23	22	4
27	16	"Wade"	3
2	11	"Hale"	3
4	10	"Murphy"	2
"Alli"	10	9	1
11	6	"John"	1
17	6	Untyped	46
12	5		

Of these, Types 6, "Stewart," and 27 account for 40.7 per cent. of the total. They are the types encountered most often in surgical streptococcal infections and in the throats of healthy subjects. Strains of the types (2, 17, and "Wade") which were together responsible for 90.5 per cent. of cases of scarlet fever in Melbourne during the same period are only rarely found in the tonsils, being 10.6 per cent. of the total. The data are given in Table III.

The close correlation between the distribution of types in the tonsils removed at operation and in surgical infections is apparent. We have not yet investigated the streptococci associated with acute follicular tonsillitis, but sixteen strains

TABLE III

Source of Strains	No. of Strains	Type 2, 17, or "Wade"	Type 6, 27, or "Stewart"
Scarlet fever	198	90.5%	1.5%
Surgical infections	31	6.5%	58.1%
Tonsils (removed at operation)	271	10.6%	40.7%

labelled "tonsillitis" which we have received during the past year from various sources in Melbourne were equally distributed between "scarlatinal" and "non-scarlatinal" types: seven being either Type 2, 17, or "Wade," seven being either Type 6, 27, or "Stewart," and two belonging to other types. Also, of five strains isolated from cases of bronchopneumonia, three of which were complicated by empyemata, two belonged to Type 17, two to Type "Stewart," and one to Type "Wade." These findings, although limited in number, suggest that there may be no great difference in pathogenicity between these "scarlatinal" and "non-scarlatinal" strains, although infection with the "scarlatinal" types is much more likely to be associated with the appearance of a rash.

In a small group of the children there is conclusive evidence that the streptococci isolated from the removed tonsils had been present in the throat months previously and were responsible originally for acute or mild symptoms. Of eleven children from whose excised tonsils Type 2 strains were isolated the histories of ten could be traced. Of these ten, two had had scarlet fever due to Type 2, and six had been direct contacts of scarlet fever patients (Type 2). One had a history of severe septic sore throat (diagnosed in the acute stage at the Children's Hospital, Melbourne) but no history of direct contact with scarlet fever. The remaining child had not, so far as could be ascertained, been in contact with scarlet fever, nor had he any very acute symptoms. In respect of the two children who had had scarlet fever, and of one contact, we know the original date of isolation of the Type 2 strain, and can state definitely, therefore, that in these children the same strain of streptococcus had been present in the tonsils for four, five, and five months, respectively. As yet no such evidence is available for those types not associated with a rash, since the onset of the original infection is not so easily determined. We hope, however, in the next year, to follow the state of tonsils in children bacteriologically examined during an attack of follicular tonsillitis.

Discussion

The findings presented in this paper leave little room for doubt that the tonsils removed at the Children's Hospital, Melbourne, contain haemolytic streptococci in a proportion greatly in excess of normal—a difference due almost entirely to a preponderance of pathogenic strains (Group A), with no corresponding increase in the number of doubtfully pathogenic strains of other groups. The clinical indications for tonsillectomy, therefore, seem to be supported by the bacterial findings in about 33 to 50 per cent. of the cases. It seemed not unlikely that more rigorous indications for the operation might be required in a teaching hospital than in general practice. We therefore examined all tonsils (twenty) removed during a three-week period at a large private hospital. We were unaware of the names of the surgeons, who were ignorant of the purpose of the inquiry. The bacteriological findings in this group coincided so precisely with those of the hospital group that we did not pursue this line of investigation.

It can be argued that, given enough time, the natural resistance of the children would have succeeded in eliminating the streptococci from the infected tonsils, and that, even if the infection persisted indefinitely, there is no direct evidence that a tonsillar carrier of pathogenic streptococci suffers any disturbance in health. In the three instances in which there is certain evidence of the date of the original infection it could be shown that this had persisted for from four to five months and that the cocci were still present in large numbers at operation. We have no definite information as to the duration of infection with types other than Type 2. But since from four to eight weeks usually elapsed between the recommendation for operation and its actual performance, and in most cases symptoms had been present for weeks or months before operation was advised, the presumption is that if these symptoms were due to streptococcal infection of the tonsils spontaneous cure had not occurred.

Chronic tonsillar carriers of diphtheria bacilli do not suffer any apparent ill effects from continued absorption of toxin if it occurs. Such evidence is also lacking in regard to chronic streptococcal infections of the tonsils, apart from their debatable relation to rheumatic conditions. Group A streptococci produce erythrogenic toxin *in vitro*, whether they are commonly associated with scarlet fever or not, though there is a certain amount of direct and indirect evidence that strains of types commonly causing scarlet fever are more powerful toxin producers (Allison, 1932). The chronic nasal diphtheria carrier often has a persistent sanguineous nasal discharge, usually without any noticeable constitutional upset. Perhaps the child with chronic streptococcal tonsillitis suffers a roughly comparable inconvenience. Were the chronic diphtheritic rhinitis curable by as simple an operation as tonsillectomy the indication for such treatment would be strong, from the point of view of both benefit to the child and elimination of a carrier. Chronic streptococcal carriers must menace the health of other children, and we know of instances where they have been the origin of cases of scarlet fever. It would be premature to recommend tonsillectomy on these grounds alone, except in special circumstances.

The preceding remarks refer only to the children—from a half to a third of the total—from whose tonsils streptococci were isolated. It has been urged by various writers that not only are a number of tonsillectomies carried out when the symptoms are in reality due to sinusitis, but, further, that the chronic infection of the tonsils is caused by reinfection from the sinus secretions. We wish only to discuss whether such a process could account for the high proportion of streptococcal tonsillar infections in this series. Simultaneously with this investigation of the tonsils, McInnes, at these laboratories, has been studying the bacterial flora of acute and chronic infections of the maxillary antrum. Out of 100 consecutive cases haemolytic streptococci were isolated on only five occasions, and only two of the five strains belonged to Group A. It is unlikely, therefore, that the tonsillar infection with streptococci is secondary to streptococcal antral infection.

The above should not be construed as a panegyric on routine tonsillectomy. In Melbourne about 17 per cent. of children of school age have lost their tonsils, as compared with 50 per cent. in the English "public" schools, and of these 17 per cent. probably not more than a third could ever have been classed as streptococcal carriers. The deductions from the data form a working hypothesis for further investigations on these lines, in which we shall attempt to correlate the clinical, bacteriological, and histopathological findings.

Summary

Group A haemolytic streptococci were isolated from 50 per cent. of a group of tonsils removed at operation in Melbourne, but from only 4.5 per cent. of throat swabs from healthy children and adults.

Haemolytic streptococci of others groups (B, C, G), which are rarely the cause of serious human infections, were recovered from 22 per cent. of the tonsils and from 13 per cent. of the throat swabs of the healthy group.

The significance of these findings is discussed in relation to the indications for tonsillectomy.

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RETROPULSION OF THE NUCLEUS PULPOSUS

A CRITICAL REVIEW

BY

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There should be a close season for the writing of articles. This would provide a breathing space in which the new ideas could be digested and the new operative procedures considered thoroughly from their theoretical aspects before embarking on the practice of them. Orthopaedic surgery is in great need of this close season. With the change from the use of hands and simple apparatus to the use of pneumatic hammers and mechanical marvels of rare alloys—a change, as it were, from the white coat to the boiler suit—there has resulted a flux of articles, mostly advocating some bolder, and therefore better, operative procedure. I, fortunately, have had enough leisure to examine in some detail the claims of a new procedure.

Before operating I decided to solve certain questions. These were: Can retropulsion of the nucleus pulposus cause symptoms? If it can, is laminectomy the only treatment? Are the results of laminectomy such as to justify operation? A study of the main articles on the subject revealed certain surprising facts which are the subject of this essay. The articles under review are:

I. Mixter and Barr (1934). *New Engl. J. Med.*, **211**, 210.
II. Mixter and Ayer (1935). Ibid., **213**, 385.
III. Barr (1937). *J. Bone Jt. Surg.*, **19**, 323.
IV. Barr, Hampton, and Mixter (1937). *J. Amer. med. Ass.*, **109**, 1265.
V. Mixter (1937). *Ann. Surg.*, **106**, 777.
VI. Barr (1938). *British Medical Journal*, **2**, 1247.
VII. Live and Camp (1937). *J. Bone Jt. Surg.*, **19**, 776.

The first six articles deal with a gradually increasing number of cases under the care of the same group of Boston authors, each article including the previously recorded cases in the series. I propose to refer to statements in these articles, and I shall then give the number of the article, the page, and the column for easy verification.

Can the Retropulsion cause Symptoms?

That retropulsion of the nucleus pulposus does occur is quite true. Andrae, working with Schmorl, found it in 15.2 per cent. of all spines. It must therefore be shown

conclusively that the retropulsion actually causes the symptoms and is not merely an incidental finding.

AETIOLOGY

The condition is supposed to be traumatic in origin. In the first series there were nineteen cases, eight (41.2 per cent.) with a history, five of them of recent trauma (I, table opposite page 210). In the second series the percentage was 41.2—that is, fourteen out of thirty-four, seven having a recent trauma (II, page 386, column i). In the third series, which, of course, included the first two, the percentage had unaccountably risen to 77.5—that is, thirty-one out of forty, twenty-one having a recent trauma (III, 328). The percentage was given as about 80, with 50 per cent. of recent trauma, in the fourth article (IV, 1265, ii); became "about 60 per cent. of these cases will give a history of trauma at, or shortly before, the onset" in the fifth (V, 777); and returned to 80 per cent., with 50 per cent. of recent trauma, in the sixth article (VI, 1248). Love and Camp do not believe trauma to be an important aetiological factor, and give no details of its incidence in their cases.

AGE OF PATIENTS

Mixter and Barr's average was 39.3 years (I, table, 210). The second article does not give an average, but states that the youngest patient was 20, the oldest 64, and that two-thirds were between 30 and 50 (II, 386, i). Barr, in his series, while including the previous cases, seems to have forgotten the patient of 64, for he gives the ages as varying from 20 to 58, with an average of 37 (III, 327). The next article has the same average of 37 (IV, 1266, i). The ages are not stated in the next two articles. Love and Camp give the average age of their patients as 39.8. We may therefore take it that the average age of all the patients was about forty years. This is of great significance, because at this age, or even many years before, it is rare to find a "normal" disk among "normal" people if we take the adolescent spine as the "normal" (cp. Beadle (1931), Med. Res. Cncl. Spec. Rep. Ser. No. 161, p. 32). This must raise doubts again as to whether any disk lesion may not be incidental rather than causative of symptoms.

SYMPTOMS AND SIGNS

The main symptom is pain, but pain differing in no way from the ordinary case of "sciatica" or "low back ache." It has a certain remarkable peculiarity: the distribution bears no relation to the nerve root alleged to be pressed upon. All cases had pain in the postero-lateral area of the thigh—that is, the second sacral dermatome (III, 329). "The areas of referred pain were identical no matter whether the fifth lumbar or first sacral nerve was involved" (III, 330). Where there was loss of sensation this also did not occur in the expected dermatome. In view of Foerster's work one would not expect to find any loss of sensation in pressure on a nerve root. Once again, is the incidental finding being mistaken for the causative factor?

Muscular weakness and paralysis were found in the first series (I, table, 210). The authors of the second paper say that the "weakness is more apparent than real, due to the protective spasm. Yet flaccid weakness and rarely paralysis were definitely observed in six patients, a unilateral foot-drop being a rare but striking finding" (II, 387, i). Still more striking were the cases of Barr: "In one instance one foot was essentially flail. In one case the gastrocnemius was the only muscle involved" (III, 332). On anatomical grounds it would be difficult to explain how pressure on a nerve root could cause a flail foot; it would be even more difficult to explain how it could cause an isolated muscle paralysis.

If symptoms are due to pressure on a nerve root it is difficult to conceive of its causing intermittent symptoms. "Symptoms have remained unilateral and have been intermittent over a period of months or years, the patient enjoying relatively good health between attacks" (II, 387, ii). Barr (III, 329, and VI, 1248) says that 40 per cent. have remissions. "Almost half had a history of remissions and exacerbations" (IV, 1265, ii). "The pain comes in attacks and there may be long remissions" (V, 778).

The only significant change in the tendon reflexes is a loss of the ankle-jerk in 40 to 50 per cent. of cases—no matter which nerve root is affected. Mixter and Ayer say that "occasionally the knee-jerk was sluggish" (II, 387, i). Barr included these cases in his later series, yet says that the knee-jerks were normal in every instance (III, 331).

In the cervical cases of Mixter and Ayer there was a dynamic block in the cerebrospinal fluid in seven out of the eight cases, but it was "always partial and sometimes very slight indeed" (II, 389, ii). Yet this series contained Mixter and Barr's cases in which there was one complete block (I, table, 210). A co-ordination committee appears to be required in Boston.

The first significant pathological finding is a raised protein content of the cerebrospinal fluid. "Every fluid showed an elevation of its protein content. The amounts were between 56 and 91 mg. per 100 c.cm." (II, 387, ii). Perusal of the table in the first article raises doubts as to whether this is completely accurate, while the later articles reveal a normal protein content in from 12.5 (III, 334) to 15 per cent. (VI, 1248) of cases. The following point must be stressed: "The causes of a total protein content above normal limits need further investigation. We have records of twenty-one unoperated-upon cases that were subjected to lipiodol examination with negative findings. In four the total protein was below 40 mg. per 100 c.cm. and in seventeen the elevated protein content has not been explained satisfactorily" (V, 779). Is the raised protein in the operated-upon cases also a coincidence?

The direct radiograph is of no value. Intrathecal lipiodol examination reveals deformation of the dural sac shadow in the Boston series, but "a broadening of the nerve root shadows or displacement or deformity of the nerve root shadows" is looked for by the Mayo Clinic authors—Love and Camp. The true appearance of a disk lesion is therefore not clear. Whether the pictures reveal real pathology or merely incidental markings is even less clear.

DIFFERENTIAL DIAGNOSIS

Love and Camp sum up this question by saying that "there are no physical, neurological, or orthopaedic signs which are found alone in protrusions of the intervertebral disks. All of the known signs may also be found in other conditions." Other conditions were, however, considered. Thus we find Mixter and Ayer stating that "in several [cervical] cases a diagnosis of multiple sclerosis was considered until the demonstration of block [by lipiodol] made that diagnosis untenable" (II, 390, i). Lest it be thought strange that there should be any confusion between multiple sclerosis and pressure on a nerve root or on the spinal cord, I must add that Love and Camp also seem to have found difficulty even in their lumbar cases, for they write: "Usually there is a paucity of neurological findings in cases of protrusions of the disks, but in some there is definite and well-marked evidence of disease of the spinal cord. In some of these cases the clinical picture may be that of syringomyelia or multiple sclerosis. In one of our cases at the clinic, because of an associated severe diabetes mellitus, the diagnosis of diabetic neuritis was entertained until fluoroscopic study with lipiodol settled the question." We are not told how this confusion between pressure on a nerve root and the symptoms and signs of disseminated sclerosis or the dissociated anaesthesia, etc., of syringomyelia can arise.

Thoughts about the danger of confusing causative factors with incidental findings are bound to arise when we consider certain cases. Mixter and Ayer, for example, found matting of the roots of the cauda equina in one of their cases; Love and Camp found two cases of tumour

in addition to the retropulsion. Again, Love and Camp had six cases of multiple lesions: one case had lesions of all disks between the eleventh dorsal and fifth lumbar vertebrae. We are not given the symptoms and signs in these cases, so we cannot discover which disk was responsible for symptoms and which were incidental findings. Case 5 of Mixter and Barr's series (I, table, 210) is that of a woman aged 53. There was no history of trauma. She complained of numbness and stiffness of the legs. She had incontinence and a complete motor and sensory paraplegia. There was a partial dynamic block of spinal fluid. The total protein in the cerebrospinal fluid was 37 mg. per 100 c.cm. A direct radiograph showed calcification in the disk between the fourth and fifth dorsal vertebrae. Lipiodol examination was not performed and operation was not allowed. She died later, and necropsy revealed calcification in a posteriorly prolapsed nucleus pulposus at the expected level. The patient, however, died of pernicious anaemia. Could this have really been a case of subacute combined degeneration of the cord, and the retropulsion merely an incidental finding—one of the 15.2 per cent.?

Treatment and End-results

Mixter and Ayer, in the second paper, report negative findings at laminectomy after negative lipiodol examination; yet Barr, while including these cases in his series, says that at operation the retropulsion was found in all cases. The next paper, however, states: "One exploration after a positive roentgenological diagnosis and six after a negative diagnosis gave negative results" (IV, 1268, ii). Mixter mentions these seven cases, but says: "In only two of these cases did the roentgenological findings suggest a ruptured disk" (V, 782).

There is one important point to consider about the actual operative technique—the question of spinal fusion. Barr states that spinal fusion and complete removal of the nucleus is desirable to prevent further extrusion (III, 337). "We believe that this lesion tends to weaken the spine and that exploration of the spinal canal will weaken it still further. Therefore we plan our approach to preserve the strength of the spine as much as possible and follow laminectomy by a bone graft if the patient does heavy work" (IV, 1268, ii). Fusion operations were done in 40 to 50 per cent. of the cases (IV, 1270, ii). Can the time in bed and the absence from work or the fusion itself have caused the relief of symptoms?

In the first series we find Case 19, a woman of 35, with no history of trauma. Her complaints were pain in the buttocks, anus, and vulva, and down the left thigh posteriorly. She had incontinence of urine and faeces, saddle anaesthesia of perineum and buttocks, and sphincter paralysis. Her legs were "essentially normal." The cerebrospinal fluid had no dynamic block, but 140 mg. of protein per 100 c.cm. *X*-ray examination showed "no changes of consequence," and lipiodol examination was negative. A lumbo-sacral laminectomy was performed, and a tumour, compressing the lowest fibres of the cauda equina and consisting of annulus fibrosus and nucleus pulposus, was removed. She developed a wound infection and died.

The next paper mentions this death and adds that three other patients in the earlier group had since died, two probably of urinary sepsis, while the cause of death in the third was unknown (II, 391, i). Though his series included all these cases, Barr reports that "two cases have died. One died of uraemia following a complete paraplegia with urinary incontinence due to the disk lesion which was present pre-operatively. The second patient died of pneumonia well over a year after operation" (III, 336). What happened to the other case of urinary sepsis and to the patient who died of wound infection? This latter death appears again in the next paper by Barr, Hampton, and Mixter—"There was one post-operative death. Three other patients have died of incidental causes but were relieved of their pain during their post-operative life" (IV, 1268, ii, et seq.)—and also in the paper by Mixter (V, 783). Yet in the sixth and latest paper Barr states: "There have been two deaths in our series: both of these patients had severe irreparable nerve damage from large ruptured disks" (VI, 1251). One is tempted to ask Professor Barr his method for the resurrection of the dead.

It is extremely difficult to evaluate results which are classified as cured, relieved, and unrelieved. Doubts as to the value of this method must inevitably arise when we consider certain cases in the first paper—the only one to give individual case histories (I, table, 210).

Case 6.—A woman of 63, with no history of trauma, complained of pain in the legs and around the abdomen, and of inability to walk. She was found to have hyperaesthesia of the legs and abdomen, spasticity of the legs, with increased reflexes; a cerebrospinal fluid protein content of 67 mg. per 100 c.cm., and a partial dynamic block. *X*-ray examination revealed hypertrophic changes, a narrow disk, and lipiodol block at the sixth to seventh dorsal vertebrae. A dorsal laminectomy was performed and an extradural mass compressing the cord was removed from the intervertebral disk involved. It consisted of nucleus pulposus. She developed a complete motor and sensory paraplegia. Under the column for results she is reported to be "unrelieved."

Case 7.—A man of 42 had no history of trauma. He complained of numbness of legs, of increasing difficulty in walking, and of pain in the back. He exhibited hypaesthesia below the umbilicus, and spasticity of legs with increased reflexes. The cerebrospinal fluid had partial (? complete) dynamic block and 114 mg. of protein per 100 c.cm. No films are reported, and lipiodol examination was not done. A dorsal laminectomy, with piecemeal removal of a mass from the intervertebral disk, consting of annulus fibrosus and nucleur pulposus and compressing the spinal cord, was performed. This man also developed a complete paraplegia, and he, too, is reported to be unrelieved.

The nucleus pulposus is degenerating notochordal remnants, degenerating because of lack of blood supply; even the rest of the disk has a poor, indirect blood supply. Retropulsed through a fissured disk the nucleus must degenerate more rapidly. Andrae quotes Ribbert as having produced herniations of the nucleus pulposus, and as having found that they are absorbed or become cicatrized and so shrink. Therefore, should not conservative treatment cure the condition without any deaths from wound infection, and without running the risk of reproach for having transgressed the principle of *Primum non nocere*?

Summary

I have made use of a number of articles to clear up doubts concerning a new procedure in an attempt to solve three questions: Can retropulsion of the nucleus pulposus cause symptoms? If it can, is laminectomy the only treatment? Are the results of laminectomy such as to justify operation? The condition of retropulsion of the nucleus pulposus is used as an example in a plea for a more careful consideration of new ideas before their adoption.

In March of this year the British Standards Institution circulated for comment a "Draft British Standard Specification for Haemoglobinometers." The draft was based on the carboxyhaemoglobin (Haldane) method. As a result of circulating this draft the institution has received a number of requests that an acid haematin (for example, Sahli) method, not involving the use of coal gas or carbon monoxide, should also be standardized. Before deciding to proceed with the additional standardization the institution desires further information and has accordingly circulated a memorandum on the subject to medical organizations and individual practitioners known to be interested in the subject. Any reader who would like a copy of this memorandum can obtain one on application to the Director, British Standards Institution, 28, Victoria Street, London, S.W.1.

Clinical Memoranda

Sulphapyridine and Soluseptasine in Meningitis due to Pfeiffer Bacillus: Recovery

Pfeiffer meningitis is usually fatal. Bloom (1931) reviews records of 302 cases with a mortality of 92 per cent. Neal *et al.* (1934) record 111 cases with a mortality of 96 per cent. If recovery occurs convalescence is usually prolonged over months, and residual palsies, blindness, and deafness are frequent. Wigers (1939) records a case with recovery treated with prontosil, polyvalent serum, and omnadin. He considers the prontosil had no evident effect. Teggart (1938) records a case with recovery treated by soluseptasine.

Case Report

On May 22, 1939, a boy aged 6, following a slight cold, complained of not feeling well and was found to have a temperature of 100°. He was put to bed. He had been quite lively throughout the day and went to sleep as usual. At 11 p.m. he was fast asleep. About 3 a.m. on May 23 he woke screaming and complained of headache. When seen at 6 a.m. his temperature was 102°, pulse 140, and respiration 40. He was restless and semiconscious, with marked head retraction, photophobia, neck rigidity, double Kernig's sign, and papilloedema. At 10 a.m. 0.25 gramme of sulphapyridine (M & B 693) was given. The cerebrospinal fluid showed: turbid fluid under pressure; no clot; 4,000 white cells per c.mm. (normal, 2 per c.mm.), all polymorphs; and numerous Gram-negative bacilli. Cultures gave a growth of a pleomorphic bacillus having the cultural and microscopical character of haemophilic bacillus (Pfeiffer's, or "influenza" bacillus).

Treatment was continued with sulphapyridine 0.25 gramme four-hourly. The restlessness was controlled by 10 grains of potassium bromide as required. Orange juice, glucose, and water were taken well. On receipt of the report on the cerebrospinal fluid soluseptasine 2.5 c.cm. was given at 6 p.m., and on the 24th 2.5 c.cm. at 3 a.m., 4 c.cm. at 10 a.m., and 5 c.cm. at 6 p.m. By 10 p.m. on the 24th the temperature was 98.6°, pulse 90, respiration 32. The patient's general condition was much improved; he was quieter, and was taking fluids freely. On the 25th a second lumbar puncture gave a count of 720 cells per c.mm. The film showed these to be chiefly polymorph leucocytes. Numerous Pfeiffer bacilli were present, but not so many apparently as on the previous examination. Few colonies only of the bacillus were seen on culture. Chlorides amounted to 0.685 per cent. (normal 0.72 to 0.75 per cent.).

Soluseptasine 5 c.cm. twice daily and sulphapyridine four-hourly were continued till June 5, when a third lumbar puncture showed: 28 cells per c.mm.; reds 16,000. Cells appear in blood proportions, with no excess of polymorphs. No pus or organisms were found. Cultures gave no growth. The presence of blood vitiated further tests. Treatment was continued for a further week. Although the boy seemed perfectly well, papilloedema was still present. On July 25 he appeared to have fully recovered.

The rapid onset and quick response to treatment are worthy of note. At no time was the patient upset by the drugs.

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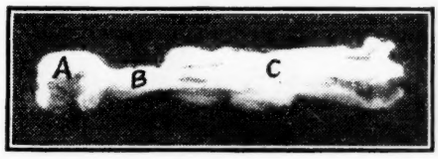
Sterilization by Section and Ligature of the Fallopian Tubes

Although a simple operation, sterilization by occluding the Fallopian tubes has in a certain number of cases resulted in failure in that pregnancy has supervened. Perusal of the literature almost gives the impression that the Fallopian tube when occluded had the property of recanalization. There is no evidence that this is so.

It is generally agreed that the safest operations are those which excise the interstitial portion of the tube or in which, when the tube is sectioned, the cut ends are buried in the broad ligament. If the tube is occluded by simply ligaturing with catgut it is not difficult to realize that the ligature may slip during tying. On the other hand, it is difficult to appreciate that a tube which has been well and truly cut and securely tied can recanalize. In many pelvic operations the anatomy is considerably distorted, and it is within the bounds of possibility that an inexperienced operator could pick up and operate on the round ligaments instead of the tubes.

A woman was brought to see me who on November 9, 1938, had had a "severe" operation for "something to do with the uterus." Owing to a bad obstetric history



A = Uterine end of tube, patent. B = Fibrous cord.
C = Isthmal end of tube, patent.

she had been sterilized. She had a period on November 25 and the last on December 20. The size of the uterus was that of a six-weeks pregnancy. Assuming that she conceived ten days after December 20, a tube must have canalized in less than seven weeks from the day of operation—a pathological event which was highly improbable. Her tubes had been occluded by ligatures, which I consider had either slipped or been applied to the round ligaments.

My own practice is to pick up and tightly clamp the tubes about one-third of an inch from the uterine ends. The tube is cut between the clamps and tied with silk. No burying of the ends is attempted. The method is simple and there is no haemorrhage. I was fortunate to be able to examine the end-results of this method when operating on a patient whom I had previously sterilized and who wished to have another child. No adhesions were present and the tubes were lying free in the pelvis. The appearance of both tubes was the same, and is shown in the illustration. The cut ends were hard and fibrosed, and were joined by a cord of fibrous tissue. It was impossible to imagine that canalization could occur. The woman had been sterile for three years.

The specimen of one side was examined histologically. Four sections were examined from the site B and showed fibrous tissue only. Eight sections from A and C showed a patent lumen. The appearance of the specimen, the histological report, and the clinical history would indicate that the simple operation of section and ligature with silk is a satisfactory method of sterilization.

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Reviews

CHROMOSOME MECHANICS

The Evolution of Genetic Systems. By C. D. Darlington. (Pp. 149; 26 figures. 10s. 6d. net.) Cambridge: The University Press; London: Cambridge University Press. 1939.

The purpose behind the writing of this book is so clearly and succinctly expounded in the brief preface that this is quoted in full.

"In the present sketch I have attempted to show genetics as the study of systems of heredity and variation, systems which rest on the basis of the chromosomes and are related to one another by processes of natural selection. I believe that the combination of the material basis with the evolutionary framework provides the only means of making sense of biology as a whole. I hope, moreover, that this elementary exposition will enable its readers to realize that the chromosome theory is now something more than a profession of faith, or even an instrument of genetic discovery; it is the key with which we are opening the door between the physical and the biological sciences."

The book is of the nature of a *tour de force*. Dr. Darlington, one of the world's leading cytologists, expounds his views on chromosome mechanics, their meaning, and their evolutionary significance. In this constructive task it is of course inevitable that much should be included that is at present uncertain and unproved. The only real criticism, however, is that a reader unfamiliar with the subject would be unable to discover how much is generally accepted, how much has a high probability behind it, and how much is based upon the author's own theories; for it must be admitted that some of the views put forward would not, in all probability, be accepted by the majority of Dr. Darlington's fellow cytologists. The preface describes the exposition as "elementary," but it is to be feared that the author will be alone in cherishing this illusion; actually it is a very difficult book indeed. Apart, however, from the one regret—that more guidance is not given to the reader as to the weight of evidence behind the various propositions advanced—this book is to be welcomed as a brilliant and stimulating attempt to build up a great mass of scattered observation into an ordered whole.

HOSPITAL ADMINISTRATION AND PLANNING

Hospital Organization and Management (including Planning and Construction). By Captain J. E. Stone, *M.C.*, F.S.A.A., F.R.Econ.S. Third edition. (Pp. 920; illustrated. 31s. 6d. net.) London: Faber and Faber. 1939.

The publication of a third edition of Captain J. E. Stone's *Hospital Organization and Management* is an important event. This is evidenced not only by a number of "forewords" and "introductions" by public men eminent in the hospital world, but by the acknowledged and accepted position which the two previous editions (1927 and 1932) have achieved as the most comprehensive and authoritative compendium in the field indicated by the title. The new edition is at once less and more complete than its predecessors. They contained a chapter on hospital law. This has now been omitted and expanded into a separate book, *Law for Hospital Authorities*. In every other respect it is almost impossible to conceive of a volume more comprehensive, more up-to-date, more accurate, more complete in every sense than this. Its more than 900 closely packed pages make it, of course, primarily a book of reference, but there are many consecutive pages which can be read seriatim with great interest. The variety of subjects dealt with is naturally very large, but the index is good.

The contents may be divided into two parts, though they are not formally arranged in this fashion. There are what may be described as the general problems of hospital policy, and there are the more specifically technical problems of construction, supplies, kitchen, laundry, and nursing arrangements, finance and accounting, administration and management. In the former of these divisions of subject-matter—the more important to those members of the medical profession and others who are not concerned with the detailed and intricate affairs of management—there is no problem which does not receive adequate statement and fair consideration. The latest reports and announcements are epitomized. Those of the recent Voluntary Hospitals Commission, the Committee on Scottish Health Services, the Committees of King Edward's Hospital Fund on Out-patients and on Pay-beds, the Medical Research Council, are all adequately noted, as well as the P E P Report on British Health Services, the British Medical Association scheme for a General Medical Service for the Nation and its Hospital Policy, and the B.M.A. and B.H.A. Joint Report on Contributory Schemes. The B.M.A. attitude towards other matters, such as the training of nurses, the payment of medical staffs, provident associations, and the relation of private practitioners and hospital services, is dealt with, and the London County Council Hospital and Medical Services are somewhat fully described. These are examples of the thoroughness with which the author uses and arranges his vast material. This *Journal* has previously described the book as "invaluable to all hospital workers"; in its latest form it is invaluable also to large numbers of persons who cannot be strictly so described.

GONORRHOEA AND ITS TREATMENT BY CHEMOTHERAPY

Traitement de la Blennorragie par le Sulfamide, une Sulfone et leurs Dérivés. By M. Palazzoli and F. Nitti. Preface by Professors F. Legueu and E. Fourneau. (Pp. 195; 19 figures. 35 fr.) Paris: Masson et Cie. 1939.

This little book contains more than its title suggests, for though it is called "Treatment of Gonorrhoea by Sulphonamide, a Sulphone and their Derivatives," the first eighty-five pages are mainly devoted to a description of the gonococcus and its characteristics, the normal histology of the urethra and its adnexa, the various examinations necessary in a case of gonorrhoea, and its complications and treatment. The last-named is reviewed historically, starting with the "laisser couler" attitude and passing through the balsams, injections, and irrigations up to the time of the introduction of the sulphonamides. This part is on classical stereotyped lines and makes no attempt to deal with the more difficult complications.

The second part contains a most interesting account of the rapid development of chemotherapy following the comparative failure of such substances as methylene-blue, mercurochrome, and trypaflavine. Of the sulphonamides the ones chiefly considered are para-amino-benzene-sulphonamide (1162 F., sulphanilamide), di-acetyl-diamino-phenyl-sulfone (1399 F.), para-(amino-phenyl-sulphamido)-pyridine (sulphapyridine, M & B 693), para-amino-benzene-acetyl-sulphonamide, and uleron. Some of these are actively bactericidal in themselves, others merely bacteriostatic, and the latter require the assistance of the body defences in order to complete the destruction of all gonococci. In

any case the two desiderata for successful chemotherapy are (1) absorption of enough of the drug to make the tissue fluids bactericidal, and (2) a sufficiently prolonged concentration of the drug in the tissues.

The authors are whole-hearted supporters of chemotherapy plus adjuvant treatment in the form of protargol 1 in 2,000 or potassium permanganate 1 in 5,000, and hold that by this means a lower dosage of drug is required, less reactions are caused, and the course of the disease is shortened. They also consider that most people use much too heavy a dosage, and claim that in the case of 1399 F. 2 grammes the first day, 1 gramme the second day, and thereafter half a gramme per day are sufficient; a total dosage of 7 to 8 grammes is effective in favourable cases, while this may be extended to 12 to 14 grammes in cases which do not react so well. For sulphapyridine they recommend 3 grammes the first day, 2 the second, and 1 gramme the third, plus irrigations, and claim that a total of 6 to 7 grammes is sufficient for cure in the great majority of cases. Not everyone will agree with the doses given; many leading venereologists in this country and in America believe in a heavy initial dosage, particularly in the case of sulphanilamide, while the question of concurrent irrigations must still be considered *sub judice;* in any case 1 in 5,000 potassium permanganate seems unnecessarily strong for use in the very early stages. However, the proof of the pudding is in the eating, and these French experts certainly get results. All venereologists will do well to study this little book, in which they will see "the other man's" point of view and in which they will find much of interest.

ANTE-NATAL CARE

Ante-natal and Post-natal Care. By Francis J. Browne, M.D., D.Sc., F.R.C.S., F.R.C.O.G. Third edition. (Pp. 622; 101 figures. 21s. net.) London: J. and A. Churchill Ltd. 1939.

Professor F. J. Browne's *Ante-natal Care* is by now an established favourite with student and practitioner alike. The third edition is a larger book than its predecessors, and in addition to two new chapters it contains further illustrations and many sections that have been revised. A chapter on heredity, with its necessary references to wrinkled peas, Andalusian fowls, and fruit flies, makes very interesting reading, but the study of human heredity is a difficult one, and the application of Mendel's laws to the inheritance of morbid characteristics is by no means clearly established. The other new chapter discusses unsuccessful pregnancy. Sections that have been extensively revised deal with pregnancy anaemia, radiology in obstetrics, and the remote prognosis of toxaemia of pregnancy based on a twelve-year follow-up of toxaemic patients conducted by Professor Browne and Dr. Gladys Dodds. The fact is established that there is a 50 per cent. incidence of hypertension occurring after pre-eclamptic toxaemia and a 70 per cent. incidence after eclampsia. The theory is propounded that the hypertension may have occurred even in the absence of pregnancy, but facts and theories are not sufficiently differentiated. It is to be hoped that the vital issues involved will be clarified in the future.

The practice of waiting for repeated haemorrhages before examining for placenta praevia does not commend itself, and few surgeons would agree that an indication for Caesarean section is a "patient *in extremis.*" The danger of shock proving fatal in accidental haemorrhage is emphasized, but the fact is overlooked that shock may be aggravated by the immediate transfer of the patient to hospital. The administration of morphine and the application of heat can be life-saving, especially where long distances have to be travelled, but they are too often forgotten in practice and are not mentioned in the discussion of treatment.

The book is filled with a surprising amount of useful information and valuable advice. Many minor criticisms can be made, but these do not detract from the general excellence of an edition which is assured of a well-deserved popularity.

THOUGHTS ON THE STUDY OF ANATOMY

The Study of Anatomy. By S. E. Whitnall, M.D., B.Ch., F.R.S.C. Fourth edition, revised and enlarged. (Pp. 113. 4s. 6d. net.) London: Edward Arnold. 1939.

Professor S. E. Whitnall has recently revised his charming little brochure *The Study of Anatomy,* written for the medical student. This book, which was first published in 1922, is well known to teachers of anatomy, and may be read with profit by all students of medicine. In it they will find the thoughts of an experienced anatomy teacher who conceives anatomy from the same high point of view that inspired the unknown author of that wonderful poem dedicated to a skeleton, the manuscript of which was found lying beside a museum specimen in the Royal College of Surgeons of England. The poem is quoted in full in the early part of the book. The additional brief notes which appear in the fourth edition of this work include the importance of a knowledge of anatomy in the practice of preventive medicine; a "mild tilt" at certain mechanized physical exercises; and some characteristic and amusing remarks on teaching and lectures. The author also gives a short list of books which may be read as recreation and diversion from the more technical studies of the prescribed medical textbooks, and which may help the reader to discern the big things in life, which physicians should both know and make known.

Commenting on "lecturers and listeners," Professor Whitnall upholds the value of systematic lectures on anatomy by speakers who can hold their audiences by their personality, originality, and mode of presentation; while, referring to the listeners, he draws the pertinent distinction between "*hearing*" (exercising one of the senses but being intellectually passive) and "listening" (hearing with a purpose and taking note—"not necessarily notes"!). We may safely predict that the present edition of this book will meet with the same general approval and appreciation that has been accorded to its predecessors.

Notes on Books

Portions of the infra-red spectrum have been photographed for more than fifty years, but technical advances have only recently brought infra-red photography into practical use. Its application is very varied, and Dr. WALTER CLARK'S book *Photography by Infra-red* (Chapman and Hall, 25s.) worthily fills a long-standing need. It is a serious and comprehensive textbook of the whole subject and contains many basic scientific data, such as the characteristics of photographic materials and the methods of sensitizing emulsions, the optical characteristics of materials in the infra-red, and lists of materials which are available commercially. The chapter on medical infra-red photography surveys the work of a surprisingly large number of authors and lists the best sources of information. The study of the superficial venous system is one of the most fruitful applications, and the author gives detailed instructions for the arrangement of lights and camera and exposure data. He also describes the infra-red photography of gross specimens and of the eye, the use of the method in dermatology; transillumination, simultaneous infra-

red and *x*-ray photography, and the differentiation of blood. Other chapters deal with the uses of the infra-red camera in botany and palaeontology, photomicrography, and such special applications as landscape photography, aerial survey, and long-distance ground photography. Infra-red radiation can also be measured by photographic means, which the author describes, and he includes two chapters on the penetration of radiation through the atmosphere. Some beautiful reproductions of infra-red photographs are included.

In *Human Development and Learning: An Interpretative Introduction to Psychology* FRANK SEELY SALISBURY, Ph.D. (McGraw Hill, 18s.) presents a volume which purports to trace the development of the human mind and the way in which the human being learns to cope with his environment. In this particular narrative there is nothing very original or new, and to English readers at least it will be found that the presentation is neither clear nor easy to read.

To help medical students with the difficulties of securing a clear-cut line of action in the management of infant feeding, Dr. V. L. COLLINS of Melbourne has drawn upon his experience as medical superintendent of the children's hospital in that city to produce an excellent small book called *Infant Feeding*. In less than 100 pages the subject is clearly set out, with definite instructions on a reasoned basis, and the treatment of artificial feeding is free from the bias of the Truby King school. The book is published in Melbourne by W. Ramsay, price 3s. 9d.

Pleasant Food for Diabetics, by A. SANDERS, formerly Sister at St. George's Hospital, is published at 3s. 6d. by Faber and Faber. In this small book carbohydrate, protein, fat, and calorie values have been entirely omitted; and the list of carbohydrate equivalents for 1 oz. bread is full of errors. Some of these "pleasant" recipes will produce unpleasant effects if used indiscriminately.

We have received a copy of an agreeable little book, *Plain Verse and Random Rhymes*, by R. D. MOTHERSOLE, M.D., M.S., F.R.C.S., published by John Read of Bolton. This collection includes items composed at intervals during the past sixty-five years. The sonnets entitled "Aquae Solis," "Cambridge," and "Mancunium" were written by Dr. Mothersole on the occasion of the B.M.A. Representative Meetings at Bath, Cambridge, and Manchester. Three other pieces appeared in the *Guy's Hospital Gazette*. Among the lighter numbers is a quatrain of advice to motorists:

> If you aim at decent driving
> Let this maxim be your guide:
> Take your left-hand corners narrow
> And your right-hand turnings wide.

On the occasion of his retirement from the chair of clinical medicine of the University of Perugia on reaching the age limit, the *Annali della Facolta Medico-Chirurgica della R. Universita de Perugia* has dedicated its twenty-eighth volume of over 850 pages to Professor Raffaello Silvestrini, formerly rector of the university and president of the medical faculty and Academy of Medicine. The volume contains fifty-three articles by Professor Silvestrini's colleagues at Perugia and other Italian universities or important cities. In addition to the first article, on microbiological methods for the investigation and identification of some sugars and other carbohydrates, attention may be drawn to the following papers: the feeding of the newborn deprived of their mothers, haemolytic anaemia in chronic malaria, syphilis and cancer, nitroglycerin poisoning, venous septicaemia, torsion of the great omentum, the effects of thyroid extracts on the course of pulmonary tuberculosis, electrocardiographic changes in experimental beriberi, cirrhogenic yellow atrophy of the liver, haematoma of the ascending mesocolon, oesophageal myomata, pituitary dwarfism, tuberculosis in the Italian army, menstrual asthma, cystic intestinal pneumatosis, pellagra in Spain, prophylaxis of dental caries in the Italian youth, trauma and tumours, diagnosis and treatment of pneumococcal peritonitis, autovaccinotherapy of typhoid fever, congenital osseous fragility, volvulus of the caecum caused by acute appendicitis, vitamin C in treatment of haemoptysis, nephritis and autovaccine treatment, diphtheria of the oesophagus, and thirty-four cases of fracture of the vertebral column. A bibliography of Professor Silvestrini's 138 publications from 1891 to 1938 and his portrait are prefixed to the volume.

Preparations and Appliances

EMERGENCY LIGHTING EQUIPMENT

An emergency electric lighting equipment which claims to be both automatic and economical has been brought out by the Salisbury Transformer and Electrical Company, Ltd. (70A, Hamilton Road, Salisbury). It is described as suitable not only for first-aid posts but also for operating theatres, observation wards of mental hospitals, control rooms, or any place where the sudden cessation of light would be inconvenient or perhaps dangerous. The equipment, working off the alternating supply, consists of a steel cabinet housing a charging unit, a transformer, and an all-metal rectifier, together with the necessary controlling devices. With it goes a sealed 12-volt battery of 72 ampere-hours' capacity, and, in the model we saw, six lamps, but any multiple of six can be provided with larger models. The disposition and power of the lamps can be modified to suit requirements.

On plugging the apparatus to the main supply the battery is charged at a rate of 6 to 7 amperes. When the battery is fully charged the main is cut off, and only a "trickle" allowed in order to keep the battery steady. Immediately on any failure of the main lighting supply the emergency lamps light up and remain lighted until the supply is restored, when the controlling device instantly switches off the emergency lamps and the charging of the battery begins again to replace the current taken. The battery when fully charged will run the six lamps for ten hours, or, with an additional battery, for twenty, which should suffice for the most dire emergency. The equipment can also be used for underground shelters, with the lamps arranged at convenient points. The apparatus in that case is plugged in to the mains supply, and when light is required it is necessary only to bring a pointer on the dial to the position of "immediate lighting." If then the mains current should be interrupted the lamps will continue to feed from the battery, and on restoration the battery will automatically charge up again.

PHRENAZOL

"Phrenazol (Boots Pure Drug Co., Ltd.) is a preparation of pentamethylene tetrazol. The chief clinical use of this compound is as a circulatory stimulant, since it acts on the vasomotor and respiratory centres and thus improves the oxygen supply of the heart. Phrenazol when administered by quick intravenous injection produces convulsions. In 1934 von Meduna introduced convulsion therapy for relief of schizophrenia. The value of this method of treatment is still a controversial question, but it is widely employed. Messrs. Boots provide two leaflets describing the use of phrenazol as a cardiac stimulant and as a convulsive agent.

IMMUNIZATION AGAINST SCARLET FEVER

Lederle Laboratories announce the issue of an improved streptococcus toxin for use in immunization against scarlet fever. Unpleasant reactions following administration are claimed to be greatly reduced by substitution of peptone in a concentration not exceeding 1 per cent. for blood or serum in the preparation of this toxin, without loss of immunizing properties. The product is marketed in this country by C. F. Thackray, Ltd., Leeds.

PREPARATION OF HOG'S STOMACH

Neopepsac brand of concentrated stomach substance (Boots Pure Drug Co., Ltd.) is a tasteless preparation of hog's stomach. The vendors recommend it for the maintenance treatment of cases of pernicious anaemia.

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A NEW EMERGENCY MEDICAL SERVICE

The medical services of this country have undergone profound disruption as the result of a war whose slow development is without parallel in history. The much-heralded *Blitzkrieg* is still in the textbook stage, and its place has been taken by a series of long-range diplomatic offensives, accompanied by the rumbling of distant thunder and very little lightning. One observer on the home medical front, disappointed, perhaps, at the sluggishness of events, has already sounded the death-knell of consulting practice. Men in consultant and specialist practice have indeed been hard hit, but their vigour, enterprise, and importance in medical life are such as to make us doubt whether they will consent readily to ante-mortem burial. The distribution and dispersal of medical personnel at the outbreak of war were based on what turned out to be an inaccurate forecast of "the shape of things to come" in the first few days. They did not come. Medical services have continued to be a rationed commodity, but there could be no corresponding rationing of civilian sickness. It is easy to allocate praise and blame after events have falsified prophecies, so we will here set down the facts in relation to the Emergency Medical Service and the position of consultants and specialists therein.

In July of this year the Central Emergency Committee of the B.M.A., in response to a request from the Ministry of Health, made suggestions for the terms and conditions of service of an Emergency Hospital Medical Service. It recommended that there should be two types of medical appointment within the service—a Class A or whole-time appointment, and a Class B or part-time appointment, which in the case of consultants permitted a maximum annual pay-out of £500; it recommended that an establishment of Class A officers should be set up by the Ministry. In general the Ministry accepted the Committee's recommendations, although it modified those relating to salaries and did not accept a proposal that a Class A establishment should be set up or a recommendation that special rates of compensation for death or injury should be paid. From this point the Ministry of Health, aided by its consultant advisers, its Hospital Officers, and its Group Officers, began the work of recruitment, handicapped, as it appeared later, by the lack of a defined Class A establishment. Outside London the great majority of appointments were made on a part-time basis. In the London area, however, the Ministry, advised by its Group Officers, permitted extensive recruitment to Class A. This action was supported at the time by many powerful considerations and expectations. It was believed that there would be a considerable number of casualties, and a large number of beds—widely distributed—were set aside for them. It was thought that many of these beds would be filled immediately after the outbreak of war and that private practice would largely disappear. But the war did not begin according to plan. Hence, nothing else has gone according to plan, and so new plans to meet the actual situation have had to be made. The time-lag has naturally been attended by much impatience and dissatisfaction. Many of our London hospital staffs have had to undergo the disillusionment of enforced leisure, and criticism has grown in volume.

Those in the whole-time service complained that private practice had not disappeared, and that in the public interest they should be allowed to undertake it despite their whole-time contracts. Private practice, according to many not called up for whole-time service, had disappeared and they were unable to live without paid employment. Another complaint was that the Ministry's reference in the contract to private practice was vague and confusing. Some consultants had been enrolled but not called up; others had been called up but not enrolled. Some, who had been officially called up, found that the Ministry did not accept responsibility for paying them. From the Provinces came the complaint that the sessional rate of pay was difficult to apply. The Ministry was naturally the focus of criticism. The Central Emergency Committee was held responsible for the restrictive conditions of the whole-time appointments, although in fact it had no responsibility for and did not expect this extensive recruitment to whole-time service. Group Officers were blamed for decisions taken not by them but by their employing body. But perhaps the real explanation is that the German Chancellor did not follow the course clearly demarcated by the military experts during the recurrent crises between 1933 and September 3, 1939.

It soon became clear that complete revision of the organization in the light of experience gained in the first few months of war was necessary. That the first attempts failed was not surprising in view of the fact that what was offered was the release from whole-time service, on the first proposal without pay, and on the second at one-third of the whole-time salary for a liability of service for four-sevenths of the medical officer's time. At this stage the Central Emergency Committee of the B.M.A. decided to assume the responsibility for making to the Ministry of Health detailed recommendations for revision of the whole service. It established a special Advisory Emergency

Hospital Medical Service Committee, which, in addition to representatives of the Central Emergency Committee, included the Presidents of the three Royal Colleges, London and provincial Group Officers, a representative of the London County Council medical staff, and representatives of consultants enrolled in the service. This Committee, under the chairmanship of Sir Robert Hutchison, rapidly completed its investigations and little more than a fortnight ago submitted its proposals to the Minister himself. We are now able to announce that the Minister has generally accepted these proposals, which are fully described in the War Notices in this week's *Supplement*. Briefly, the reorganization involves the creation of a Class A establishment of whole-time officers to consist in the main of administrative and house officers, and of practitioners of the standing of registrar or chief assistant. It is intended that, where consultant services are at present provided by Class A officers, these may in future be provided by consultants and specialists on a part-time basis, each practitioner enrolled in this group receiving a salary of £500 per annum with adequate travelling expenses, remaining liable without additional remuneration for spells of additional service according to the demands of the moment. Class B enrolment will largely disappear, except where the employment of practitioners on a sessional basis is necessary to supplement the services of salaried clinical officers. With this exception the general method of remunerating the hospital staffs, hitherto recruited to Class B, will be by a *per caput* payment for medical services on an occupied bed basis, this payment to pass to a staff fund for distribution among the staff. The full details of the revised scheme are worthy of careful study. It deals also with the payment of house officers and the method of recruiting them; it provides for continual consultation between the Ministry and the new Advisory Committee; it defines the patients within the scope of the Emergency Medical Service. The success of the reorganization depends largely on the willingness with which medical men now under whole-time contract for a minimum period of one year relinquish those contracts in favour of the part-time contract which will shortly be offered to them. This offer, by the way, will be made not only to those who have been enrolled and called up but also to those who have been enrolled but not called up, and to that not inconsiderable group who have been giving their whole-time service but have not yet been enrolled.

The Central Emergency Committee and its Advisory Emergency Medical Service Committee have good reason to be grateful to the Minister for his prompt consideration and acceptance of the revised proposals. It recommends to the profession the acceptance of a plan which goes far to remedy some very real grievances.

CLARIFYING THE PITUITARY

Dr. H. B. van Dyke's second volume on the physiology and pharmacology of the pituitary body[1] is in effect a critical digest of the experimental literature which has appeared since the publication of the first volume in 1935. The need for such a guide is shown by the fact that approximately 750 articles appear annually on the subject. It might be alleged that the quantity is more conspicuous than the quality, but it would be fairer to describe the present phase as one of consolidating in detail the advances previously made. Nevertheless, some notable advances have been made in clarifying certain aspects of the complex functions of this organ. Dr. van Dyke's provision of a brief summary of his opinion on recent work at the end of each chapter is most helpful in enabling the reader to assess such advances. On the anatomical side he calls attention to the fact that the complex blood supply of the pituitary includes a portal system to the glandular part. He thinks that there is little basis for postulating any chemical influence of pituitary hormones on the diencephalon, but ample evidence of nervous influences operating in the reverse direction, of which the release of gonadotrophic hormones through nervous action is an outstanding example. In this connexion it is of great interest to learn that in birds and certain mammals stimulation of the optic nerves by light conveys impulses to the diencephalon which influences this release and consequently the date of the mating season. In animals without such seasonal variations such stimuli do not play an evident part. The fact that morphological changes following gonadectomy can be corrected by oestrogenic or androgenic substances affords experimental support for the clinical use of the former at the climacteric. In human beings the chorionic villi of the placenta produce enormous quantities of luteinizing hormone until gestation is complete or the foetus dies. Chorion epithelioma and hydatidiform mole produce a hormone chemically identical with that of normal pregnancy. The complex nature of the influence of pituitary hormones on lactation is shown by the failure of injection of lactogenic hormone to initiate lactation after ablation of the pituitary. It is a point of considerable biological interest to find that this hormone can be assayed by its stimulating effect on the growth of the pigeon's crop glands, showing the close homology between them and the mammary glands.

Turning to the association between the adrenals and the pituitary, it appears that the morphological and functional maintenance of the cortex of the former, including the sex-determined "X zone," depends on secretions from the latter; the adrenotrophic anterior pituitary hormone also seems to play a part in the

[1] *The Physiology and Pharmacology of the Pituitary Body.* Volume II. By H. B. van Dyke. London: Cambridge University Press. 22s. 6d. Chicago: University of Chicago Press. 4.50 dollars.

metabolism of fat, causing fat to be transported from the tissue depots to the liver. This is curious, since it has been known for some years that the posterior pituitary secretion, pitressin, has a similar action. Our knowledge of the role of anterior pituitary hormone in carbohydrate metabolism continues to grow, and the antagonism between it and insulin is now well established. In the absence of the latter the former exhausts carbohydrate reserves and leads to dangerous ketosis. Yet on the other hand the anterior pituitary appears to be necessary for the normal absorption of dextrose from the alimentary tract. We are indeed reaching the point at which the pituitary appears to intervene at every phase of metabolism throughout the body, justifying its description as the master gland. It is increasingly clear that it may also be described as the central transformer of nervous into chemical energy, just as the nerve endings are the site of a similar transformation at the periphery.

"Q" FEVER

A number of cases of fever occurred in Brisbane in 1935 which presented features suggestive of a distinct clinical entity; similar cases had first been noticed in 1933. Derrick,[1] who investigated the outbreak, found that the illness was of acute onset with generalized malaise, intense and persistent headache, fever, and relative bradycardia. The temperature rose rapidly, usually remaining between 102° and 104° F., although sometimes there were large daily remissions. Two main types of illness were distinguished: in one the fever lasted six to nine days and terminated with a definite crisis resembling urban or murine typhus; in the other the fever was much more prolonged, and ended by gradual defervescence with occasional recrudescence. The fever, which was in no case fatal, differed from the typhus group in the absence of characteristic rash and, especially, in the consistently negative response to the Weil-Felix test with different strains of *B. proteus*. Photophobia was often present and sometimes congestion of the conjunctivae suggestive of leptospirosis, but all tests for this infection were negative. The relative absence of localized respiratory symptoms and the sporadic distribution were against a diagnosis of influenzal disease, and specific tests excluded the enteric and brucella groups of infections and all the commoner animal diseases. During the investigations inoculation of the patient's blood or urine produced in guinea-pigs a characteristic non-fatal fever of from four to six days' duration followed by long-lasting immunity to further inoculation. Guinea-pigs killed during the febrile attack had enlarged spleens, but other abnormalities were few, and as no organisms could be seen or cultivated it was thought that the infecting agent might be a virus. Burnet and Freeman[2] of Melbourne investigated this possibility and produced characteristic pathological effects by transmitting the infection to mice. Mice killed seven to ten days after inoculation showed enlargement of the liver and spleen, which contained large intracytoplasmic microcolonies of rickettsia-like organisms. These organisms take the form of Gram-negative tiny rods about 1 μ long and 0.3 μ broad, although occasionally long forms are seen. By Castaneda's method most of these organisms stain blue, but less so than psittacosis bodies, while some may be pink; with Giemsa they are reddish purple and in heavy infections easily recognizable. They are only found in intracytoplasmic accumulations in the infected animals and are not capable of growth in standard biological media. They survive in, but do not produce characteristic lesions of, the chorio-allantois of the developing chick; cultures in chick embryo in Tyrode's solution develop relatively slowly compared with viruses, and continue to grow in severely damaged tissues.[3] The organisms are with difficulty filterable through relatively permeable (0.7 μ) gradocol membranes. Infected tissues remain virulent for many weeks when stored in the refrigerator, and the infecting agent appears to be resistant to glycerol. In size, shape, staining reactions, intracellular habitat, and cultural and pathogenic properties the organism resembles a rickettsia, and the name *Rickettsia burneti* has been proposed by Derrick,[4] although Wilson[5] and Brumpt[6] are doubtful whether it should be classed as a rickettsia. The organism is present in the blood of patients during the febrile period, and may be present in the urine in the later stages and during convalescence. In routine diagnosis normal and immune guinea-pigs are inoculated. By differential centrifugation of the spleens of infected mice rickettsia suspensions have been obtained and are agglutinated by sera from the patients and experimentally infected animals; rising titres are found during the course of the disease and the method has obvious diagnostic value. Monkeys and dogs[7] are susceptible, rats are mildly so and develop inapparent infections, while rabbits are insusceptible. None of the susceptible animals are thought to play any part in the natural spread of the disease, and its epidemiology is obscure. Most of the cases occurred in meat workers and dairy farmers, and it is thought that there may be a reservoir in some animal with a blood-sucking parasite as a vector. This mechanism of transmission has been suggested as an explanation of a number of accidental human infections during experimental work. These infections seemed definitely to be associated with experiments in mice, and it is suggested that in one group[9] the mite *Lyponissus bacoti* may have been responsible for the transmission, but in the other[10] infection probably occurred, possibly through some skin abrasion, by direct contact with infective mouse tissues. In an endeavour to find some natural reservoir of infection many bullocks, sheep, and pigs were examined

[1] *Med. J. Austral.*, 1937, **2**, 281.
[2] Ibid., 299.
[3] *Austral. J. exp. Biol. med. Sci.*, 1938, **16**, 219.
[4] *Med. J. Austral.*, 1939, **1**, 14.
[5] *Bull. Hyg.*, 1938, **13**, 123.
[6] Personal communication quoted in *Austral. J. exp. Biol. med. Sci.*, 1938, **16**, 219.
[7] *Med. J. Austral.*, 1938, **1**, 296.
[8] *Austral. J. exp. Biol. med. Sci.*, 1938, **16**, 245.
[9] *Med. J. Austral.*, 1939, **1**, 11.
[10] Ibid., 13.

without the organism being recovered. On the other hand, four out of thirty sera from bandicoots in South Queensland agglutinated at titres of 1:10 or more suspensions of the specific organism. The fevers of the Queensland coast have long been a complex problem, but the careful work described here seems at least to have disentangled one of them, and although the picture is still incomplete the investigators are to be warmly congratulated on their results.

STILBOESTROL

Since we first referred[1] to the actions of the synthetic oestrogenic substance known as stilboestrol discovered by Dodds, Golberg, Lawson, and Robinson,[2] much clinical and physiological work on the substance has been carried out. In this *Journal* Winterton and MacGregor[3] then reported that stilboestrol given by mouth or intramuscularly relieved post-menopausal disorders, amenorrhoea, senile vaginitis, leucoplastic vulvitis, and dysmenorrhoea as effectively as injections of oestrone. Simultaneously Bishop, Boycott, and Zuckermann[4] recorded that stilboestrol caused "oestrone withdrawal bleeding" in amenorrhoea and an oestrous vaginal smear in post-menopausal patients. Uterine proliferation in the monkey, similar to that following administration of oestrone, was also observed. These findings have been amply confirmed by other clinicians.[5 6 7 8 9] Whereas English workers found that the toxic effects of stilboestrol (chiefly nausea and vomiting) were present in only a small proportion of cases and were of a temporary nature, Continental workers considered these symptoms to be more serious; Varangot,[9] for example, states that only a few of his patients could tolerate a course of treatment lasting more than a month. The number of patients treated with the new drug is, however, as yet too small for any conclusion to be reached on this question. It is evident that there is much individual variation in tolerance. On the biological side, the observation of Dodds, Lawson, and Noble[10] that stilboestrol causes oestrus in rodents, sensitizes the rabbit uterus to the action of progesterone, and produces mammary growth in the guinea-pig has been confirmed,[11 12 13 14] and further similarities between the actions of the natural and synthetic products have been published. Thus oestrone depresses anterior pituitary function; Folley and Watson[15] have shown that the action of prolactin on the crop-gland of the pigeon and lactation in guinea-pigs and rats is inhibited by stilboestrol, which also inhibits lactation in women.[3] According to Noble[16] the drug depresses the diuretic, gonadotrophic, and growth-promoting functions of the rat's pituitary. The pharmacological effects of oestrone and stilboestrol are also alike, since Dawson and Robson[17] have demonstrated that they both inhibit the spontaneous contractions and tone of the isolated rabbit intestine *in vitro* and abolish its response to motor drugs such as adrenaline, histamine, etc. The castration cells of the castrate rat's pituitary are abolished by administration of stilboestrol.[14 18] Both the synthetic and the natural oestrogenic substance have a protective action against the necrosis in the tail of the rat brought about by injection of ergotamine or adrenaline.[19] This effect led Cobet and Ratschow[20] to give stilboestrol to patients with Raynaud's disease and other circulatory disorders. Their results were favourable, and they suggest that the action on menopausal flushes is direct. The only instance so far reported of failure to reproduce the effects of stilboestrol with oestrone is that of Mühlbock,[21] who could not inhibit the capon comb-growth stimulated by testosterone by simultaneous application of stilboestrol. This finding is, however, partially contradicted by the report of Kreitmair and Sieckmann[11] that stilboestrol diminishes the comb size in the cock but not in the capon. It is thus apparent that at the moment no differences have been observed between the actions of the natural oestrogenic hormones and the synthetic product.

[1] *British Medical Journal*, 1939, **1**, 23.
[2] *Nature*, 1938, **141**, 247.
[3] *British Medical Journal*, 1939, **1**, 10.
[4] *Lancet*, 1939, **1**, 5.
[5] *Münch. med. Wschr.*, 1939, **86**, 261.
[6] *Klin. Wschr.*, 1939, **18**, 160.
[7] *Münch. med. Wschr.*, 1939, **86**, 582.
[8] *J. Obstet. Gynaec. Brit. Emp.*, 1939, **46**, 1.
[9] *Presse méd.*, 1939, **47**, 725.
[10] *Lancet*, 1938, **1**, 1389.
[11] *Klin. Wschr.*, 1939, **18**, 156.
[12] *Lancet*, 1939, **1**, 933.
[13] *Klin. Wschr.*, 1939, **18**, 346.
[14] *Münch. med. Wschr.*, 1939, **86**, 436.
[15] *Lancet*, 1938, **2**, 423.
[16] *J. Physiol.*, 1938, **94**, 177.
[17] *J. Physiol.*, 1939, **95**, 420.
[18] *Endokrinologie*, 1938, **21**, 20.
[19] *Klin. Wschr.*, 1939, **18**, 278.
[20] Ibid., 1939, **18**, 347.
[21] *Nature*, 1939, **143**, 160.

STAB WOUNDS OF THE ABDOMEN

There can be no question that penetrating wounds of the abdomen call for laparotomy, since it is always possible that viscera or blood vessels may have been injured, and if such injury is not promptly repaired there is the obvious risk of peritonitis or of gross intraperitoneal haemorrhage. Writing on stab as distinct from gunshot wounds, L. T. Wright, R. S. Wilkinson, and J. L. Gaster[22] of New York point out that these may be divided into stab wounds of the abdomen and stab wounds of the abdominal wall; the mortality from the former is around 33 per cent., and from the latter is either low or altogether absent. Difficulty may arise, however, in deciding whether a wound has actually penetrated the coelomic cavity or not. Although in most cases it is true to say that at the time of admission to hospital there is adequate clinical proof of intra-abdominal injury, there is a border-line group which may cause anxiety. At Harlem Hospital it was at one time the custom to wait and attempt to ascertain clinically whether penetration of the abdomen had occurred or not, but the more recent practice of operating for every stab wound has been followed by a reduction in mortality for all types of case. Operation consists in dividing the abdominal wall down to the peritoneum and exploring the wound track to decide whether the peritoneum has been penetrated or whether there is haemorrhage within it. The peritoneum is not opened unless it is found to have

[22] *Surgery*, 1939, **6**, 241.

been wounded or unless it obviously contains much blood. If a patient admitted with a stab wound is badly shocked he is given intravenous fluid by the slow-drip method. *X*-ray films are taken of both the chest and the abdomen, as pneumoperitoneum may be present and the chest may have been entered as well as the abdomen. The authors state that under no conditions should spinal anaesthesia be used for the exploratory operation, because if the intestine is perforated the augmented peristalsis increases the escape of intestinal contents into the peritoneal cavity. They favour either open ether or a combination of nitrous oxide, oxygen, and ether. If the large bowel is penetrated where it is mobile, as in the sigmoid or transverse portions, they exteriorize the injured part. In 184 cases consisting of 130 penetrating wounds of the abdomen and fifty-four of the abdominal wall, there was a total mortality of 13.5 per cent. These authors believe that suturing without drainage should not be done, and employ drainage in the majority of their cases of penetrating wounds.

ATMOSPHERE IN JAPANESE TEXTILE WORKS

In a report published by the Japanese Institute for Science of Labour, Drs. Sinzi Katuki and Hirosi Sukegawa describe the atmospheric conditions observed by them in seventy-eight spinning and weaving factories at Osaka. In the cotton-spinning factories the temperature was above 80° F. for six months of the year, and was sometimes 95° during August, while the air was 70 to 80 per cent. saturated with moisture in a few of the workrooms, though usually about 60 per cent. saturated. In the weaving sheds the conditions were worse, the air usually being 75 per cent. or more saturated, as well as having a temperature of 90° (in August). The conditions were no better in the silk, woollen, and hemp-thread factories investigated, so it follows that they were extremely trying for the workers. In was found that marked differences existed in the atmospheric conditions of the workrooms in various factories, partly the result of the structure and equipment of the buildings. In one instance it was found that the humidity of the air in a weaving factory was induced by blowing in steam instead of spraying cold water, and in general the managers of the factories showed lack of understanding and indifference, while the technical staff did not appear to pay any attention to the health and efficiency of the workers. A detailed examination by Dr. Yogi of the output from a spinning factory showed regular variations during the course of the year, dependent chiefly on the environmental temperature. The feeling of fatigue experienced by the female operatives at a cotton mill was investigated by means of a questionary, and it appeared that in August 24 per cent. of the weavers had a feeling of tiredness at 11 a.m., and 43 per cent. at 4 p.m. The corresponding figures for December were 6 and 13 per cent. An investigation of the temperature "comfort zone" showed it to be about 72° in summer and 66° in winter, so it is evident that in summer the operatives seldom experienced comfortable working conditions.

MEDICAL STAFFING OF FIRST-AID POSTS

The Central Emergency Committee has since the beginning of the war been in constant touch with the Ministry of Health on the subject of the staffing of first-aid posts. It was urged upon the Ministry that in the interests of efficiency a medical officer should be in complete charge of each first-aid post instead of only being responsible for the training of first-aid personnel, as he is at present. The peace-time arrangements in regard both to scope of responsibility and to remuneration were looked upon as inadequate. At the outbreak of war many medical men attached to aid posts, disregarding the limited range of their responsibilities, gave a large part of their time, in some cases the whole of it, to bringing to a high standard of efficiency the posts to which they were attached. They did this without waiting to be assured that they would be properly remunerated for this work. Subsequently the British Medical Association asked the Ministry that the whole issue of the war-time duties and payment of these medical practitioners should be placed on a proper basis, and the Minister promised a representative deputation that the matter should be fully considered. His reply is now available and is set out in the war notices on page 227 of this week's *Supplement*. It relates to posts, fixed and mobile, in vulnerable areas only. It is now agreed that a medical man shall be in complete charge of his first-aid post, continue to undertake the collective training of personnel, and have new responsibilities in connexion with general maintenance and administrative control. Local authorities will be authorized to pay to the medical officer in charge a salary of £75 a year, in addition to the sessional fees for attendance owing to an actual air-raid on the locality of the post. This replaces the previous arrangement whereby the rate of payment was twenty guineas a year. In non-vulnerable areas, however, the twenty-guinea payment will continue in operation. Further, it is agreed that where medical officers were required to attend their aid posts at the outbreak of war the payment of sessional fees will be authorized up to the receipt of Circular 1869 issued on September 9, 1939.

We regret to announce the death of Sir William Prout, K.C.M.G., formerly physician to the Hospital for Tropical Diseases, London, and senior consulting physician to the Colonial Office; also of Mr. Naughton Dunn, lecturer on orthopaedic surgery in the University of Birmingham and honorary surgeon to many orthopaedic institutions.

Professor E. D. Adrian, M.D., F.R.C.P., F.R.S., has been appointed a member of the Medical Research Council in the vacancy caused by the death of Professor John Mellanby, M.D., F.R.S., last July.

As Australia is at war the sixth Australasian Medical Congress (B.M.A.), which was due to be held in Perth in September, 1940, has been postponed indefinitely.

SURGICAL PROCEDURES IN GENERAL PRACTICE

This is one of a series of articles contributed by invitation

TRAUMATIC SYNOVITIS AND INJURIES TO THE LIGAMENTS OF THE KNEE-JOINT
(EXCLUDING MENISCUS INJURIES)

BY

G. R. GIRDLESTONE, F.R.C.S.

Synovitis of the knee is recognized by the enlargement, warmth, and tenderness of the joint; there may be a soft crepitation on movement, with pain and resistance before the normal limits of flexion and extension are reached, and the joint is usually held a little flexed.

Acute traumatic synovitis of a knee-joint may be due to: (1) a direct contusion of any part of the knee-joint; (2) a sprain—that is, the stretching or tearing of ligaments by a forced movement in any direction beyond normal limits; (3) overuse or unaccustomed use—for example, strenuous football or ski-ing after inadequate training; (4) a fracture involving the joint (to be dealt with in the next article). Chronic traumatic synovitis may follow continued excessive use of a normal joint or ordinary use of a joint which is poorly aligned for strain or weight-bearing.

Diagnosis

It is necessary to exclude a ligamentous sprain or rupture, a fracture, and an internal derangement before we can diagnose an uncomplicated traumatic synovitis. The ligaments are first tested and the exact locality and extent of any damage noted. If the injury has been at all severe radiographs (antero-posterior and lateral) are taken in order to exclude fracture, including the uprooting of a tibial spine.

An internal derangement is evidenced by the history of something going out of place and immediately locking the joint—that is, limiting its full range: a subsequent sensation of something slipping into place again is almost pathognomonic. Occasionally the displacement is so quickly followed by replacement that neither "locking" nor "unlocking" is noticed. The lock associated with internal derangement is quite different from the stiffness associated with muscular spasm or with fluid and perisynovial infiltration; though when there is much limitation of movement and swelling after injury a lock cannot be discovered. Indeed, it is often impossible for anyone, faced with a hot swollen knee a day or two after a severe sprain, to say certainly, or even probably, whether a meniscus has been damaged or not. But it is one's experience that, in general, the more severe the ligamentous damage the less likely are the menisci to be damaged. If the ligaments are badly sprained the menisci themselves usually escape, though their attachments to the lateral ligaments may well be torn. The menisci suffer from rotary movements on an axis, associated with the maintenance of axial compression by intact ligaments rather than the non-axial strains which stretch and tear the ligaments. It is, however, often impossible to be sure, but it is bad practice to diagnose or even to suspect cartilage damage without something very suggestive in the history, symptoms, or signs.

Localization of Damage.—Having come to the conclusion that one is dealing with an uncomplicated case of traumatic synovitis of the knee, it is of the greatest value to ascertain exactly what has happened, and to localize the pathological condition underlying the synovial reaction. The success of treatment, judged by rapidity and permanence, rests on the exact recognition of, say, a local bruise or infiltration round a ligament, which, though exquisitely tender and so painful as to make walking impossible, may be dramatically cured by injection of a local anaesthetic with massage and active use. In another case a heavy blow on the articular margin of the tibia may cause a reaction of the joint so severe as to establish traumatic arthritis and prolonged trouble unless it is immediately and completely put at rest for just a few days. Careful palpation and the trial of various strains will usually disclose the nature and situation of the injuries.

Principles of Treatment

First among the principles comes the recognition that all joints have an ample and delicate sensory innervation. The nerve endings in the subsynovial tissues serve to protect the joint against overuse (witness the neurotrophic joint), and the sensory spindles in the ligaments give warning of dangerous strains. This fully protective nerve supply explains the supreme need for *rest* once the joint tissues have become inflamed. The second principle concerned is that of *movement*. In dealing with a perisynovial or pericapsular infiltration associated with some severe injury there is an indication for early movement in order to avoid the organization and contracture of the granulation tissues into adhesions. The third principle concerns the preservation and restoration of muscular power and tone.

At first sight these three principles would appear mutually antagonistic, but if rest is made the rule, and movement the exception, in the form of a single, very gentle, and slow active movement through the greatest possible range, the inflamed tissues will not be irritated. It should be needless nowadays to point to the great superiority of active movements over passive by calling to mind the relaxation of the opposing muscles that follows active flexion and extension. Full rotary movements of the knee are beyond the control of the supine or sedentary patient. Their evolutionary value is to enable the body to turn and swerve on the fixed tibia and thus to escape the clutch or tackle of the foe. Then, again, the muscles can be kept in order by faradic stimulation and by contractions without movement, even by movements of the limb as a whole without movement of the knee.

We can then solve the dilemma set up on one side by the golden rule of rest for painful irritated tissues supported by Hilton, Thomas, and Robert Jones, and on the other by the desire to avoid adhesions, with delay or even impairment of function. If the ligaments are stretched or torn they need protection by posture or by splintage. In most cases the difficulty is easily overcome by an intelligent mixture of rest, movement, and massage: (1) Rest and, if need be, protection by splintage—for example, a broad aluminium or plaster-of-Paris gutter. (2) Single, very gentle, coaxed active major movements:

the masseuse should finally carry out the rotary movements of the tibia very gently and slowly. (3) Effleurage of the perisynovial tissues and surrounding areas directed toward emptying lymphatics and reducing the cellular infiltration in addition. In some cases graduated massage and active use rapidly restore normality. In a few instances the extra-articular injection of planocaine 2 per cent. into a tender and painful area, singly, or repeated daily for a few days, may allow the patient to be active and make all the difference in speed of recovery due to the absence of reflex and disuse atrophy.

Organized "Adhesions"

In a rather different category are the cases of synovitis seen at a later stage when there is already limitation of movement by organized adhesions; in these, preparatory physical treatment, followed by gradual active and passive movements, is indicated. The sedative effect of the infra-red ray or diathermy or plain radiant heat may be a valuable daily introduction to gradual manipulative movement. Manipulation under anaesthesia may be needed.

Chronic Synovitis

The knee in particular is dependent upon the integrity and strength of its muscles and ligaments, and chronic synovitis is peculiarly liable to persist after acute synovitis of the knee where the condition of the muscles has not been especially regarded. Although the original cause may have disappeared, synovitis is still present and kept up on account of the lack of muscular and ligamentous tone. A mild vicious circle exists. This is dealt with by impressing upon the patient the principles of (*a*) avoidance of strain, (*b*) the necessity for complete rest of the whole limb supported throughout its extent, and (*c*) active natural use, first for only two or three minutes at a time, many times in the day. Every means should be taken to improve local circulation by massage, diathermy, active movements, and exercises. The correct dosage of rest and exercises is assured if the muscles are gaining and the fluid losing day by day. The use of elastic knee-caps should be restricted to periods of fairly strenuous activity during the later stages of convalescence—for example, a rugger match—before the knee and its guardian muscles and ligaments are fully taut.

Rupture of Ligaments

The medial collateral ligament may be sprained or even completely ruptured by any powerful force opening the inner side of the knee. The tear is usually above the level of the joint near the upper attachment, which may be pulled away. Its wide attachment to the tibia is very seldom torn.

In moderate cases (sprains) the ligaments are pulled rather than completely ruptured, and treatment will vary with the degree of laxity and with the associated damage to the quadriceps and the vastus internus in particular if the damage concerns the medial ligament. A few days in bed with the joint slightly flexed over a pillow to relax the ligaments may be necessary to begin with. This should always be associated with massage, together with faradic treatment of the vastus internus and active muscular contractions of the quadriceps as a whole. As soon as the reaction of the joint is over, the patient is allowed up, but must be strictly told to wear only strong leather shoes and the heel on the side of the injury is wedged up—half an inch in the male and a quarter of an inch in the female. The patient can then walk on even surfaces with careful muscular control.

Treatment in severe cases (complete rupture) begins with the application of a plaster cast, unpadded except for a circle of felt to protect the patella. The knee is set at an angle of 175 degrees. A haemarthrosis may be aspirated before application of the cast, a lateral puncture into the suprapatellar pouch being the easiest, and the skin puncture sealed with collodion. The plaster cast extends from the great trochanter to just above the ankle-joint. Walking and leg-raising exercises are encouraged after the first day. For a really severe injury such as complete rupture three months of immobilization is necessary. But in many cases a long knee-cage can be substituted for the plaster after six or eight weeks.

The external collateral ligament is less often injured. Again the ligament does not rupture in the middle, but near one or other bony attachment; or its fibular attachment may be pulled off.

The cruciate ligaments may be torn or avulsed by extreme hyperextension, lateral angulation, or dislocation. The commoner causes are extreme hyperextension—as when at rugger a runner's impetus carries his body on with his weight-bearing leg held firmly by a tackler—or a backward displacement of the flexed tibia on the femur in a motor accident. To test for the integrity of the cruciate ligaments the patient sits opposite the surgeon with the knee flexed to a right angle and the foot firmly supported on the ground between the examiner's two feet.

Testing the cruciate ligaments.

Then the examiner grips the head of the tibia and tries to force it backwards or forwards under the condyles of the femur (see Fig.). Forward movement of a sliding nature indicates laxity or rupture of the anterior cruciate, and backward sliding signifies a posterior cruciate ligament lesion.

The treatment consists in immobilization at an angle of 170 degrees for two or three months in a hip-to-ankle plaster, allowing and encouraging active hip, ankle, and foot movements from the start and weight-bearing as soon as the acute symptoms subside, usually at the end of a week. After the plaster a hinged bucket calliper is employed. Everything depends on developing exceptional muscular strength and tone by intensive gymnastic exercises. Even in old cases muscular control may be sufficient to discount great ligamentous instability, and may enable the patient to lead an active life. Such an attempt should always be made before considering operative reconstruction of the cruciate ligaments by fascial grafts, arthrodesis, or the permanent use of a long knee-cage.

Dislocation of the Patella.—This may be purely traumatic or be predisposed by knock-knee. The dislocation has generally been reduced at once. The diagnosis is made from the history and the site of tenderness. The treatment consists in the development of the quadriceps

by active exercises and faradic stimulation. If the dislocation is recurrent there is need for expert choice of the best operation in regard to the particular case.

Dislocation of the knee is usually obvious; it will be revealed by radiographs if the enormous swelling obscures everything. Injury to nerves or vessels should be looked for and noted. Reduction is possible only under general anaesthesia; difficulties may be presented unless displacements of patella or hamstrings are recognized and dealt with first. If there is much effusion, aspirate under full aseptic precautions and observe for a week, immobilizing the leg on a slung Thomas splint; afterwards allow the patient to walk in a complete plaster cast at 170 degrees for eight weeks. This is followed by active physical treatment and the temporary use of a long knee-cage if necessary. The result is generally better than the prognosis.

EYE CASUALTIES IN THE WAR

BY

ROBERT DAVENPORT, F.R.C.S.

Medical Commandant, St. Dunstan's

At the outset of the war in 1914 no special arrangements were in force for either war-blinded men or the segregation of serious eye lesions in specialized hospitals.

Through the enthusiasm and energy of the late Sir Arthur Pearson St. Dunstan's was founded, and No. 2 London General Hospital organized by the authorities to receive and treat the men before passing them to St. Dunstan's. St. Dunstan's has trained and cared for its charges since 1914, adding new cases each year to its numbers, and building up an organization which is world-famous. With the ageing of the men the need for a home for the sick and those recovering from illnesses or operation increased, and in 1938 St. Dunstan's opened its new home on the Downs by the sea near Rottingdean. In it was put all that time and experience had shown to be of value to the blind, whose comfort, physical and mental, was provided for in every possible way.

Many months before September, 1939, the Council offered the home to the Government for adaptation as a hospital for the serious eye casualties of the fighting services in the event of war. The offer was accepted and plans were completed for conversion, staffing, and addition to the existing building.

St. Dunstan's by the Sea

As a result there was available on the outbreak of war a modern, very suitable building to which agreed ophthalmic personnel, surgical and nursing, was posted. The existing dormitories were readily turned into excellent wards by the minimum of necessary plumbing and wiring, and the existing treatment room adapted as a temporary operating theatre, the necessary equipment for which was already bought and on the spot. Rather more than 130 beds in four open wards, and in two corridors of two- and four-bedded rooms are available, and beds and equipment are in reserve for the conversion of lounge-room space into two more wards, so that somewhere near 200 cases can be housed.

Plans and specifications for a new operating theatre block were ready, and work was started on this necessary addition during the first week of the war, and the unit is expected to be ready for use by the end of November. A fly-over bridge carries the corridor to the block, which comprises changing rooms, anaesthetic lobby leading to two theatres, dressing room, and sterilizing room. Experience of the last war suggested that general, facial plastic, and nasal sinus surgery would need to be provided for, and one theatre is equipped to this end, although both will meet the demands of either ophthalmic or other surgery. With lighting restrictions in mind and the avoidance of glass no windows exist in the block, which is artificially lit throughout, warmed, and air-conditioned by modern means. The windowless block fits in well with the requirements of both ophthalmic and E.N.T. surgeons.

The block is tucked against a high chalk bank, but its exposed sides are protected from splinters by steel sheeting and its roof by sandbags. Where the new corridor leaves the existing building a small but efficient *x*-ray department is being fitted up, bringing it into close contact with the theatres. The equipment for this department and the theatre block is of a very high order, and this factor and the beautifully designed and fitted "wards" will mean that serious eye casualties sent to St. Dunstan's will find it an admirably sited, comfortable, and efficient hospital, fully prepared to do all that is possible for repair of their wounds. In addition to the resident ophthalmic surgical staff a panel of consultants has been arranged so that all branches of work may be dealt with, and to add to the existing nursing personnel, specialized and auxiliary, there is held a list of V.A.D.s available for duty when required.

For those whose sad lot can only be that of blindness there is ready the whole organization of St. Dunstan's. Such men will be retained for the training, technical and psychological, which is directed to the founding of a useful and happy life under the disability of blindness.

USE OF STORED BLOOD FOR TRANSFUSION

SOME PRECAUTIONS TO BE TAKEN

We have received the following communication from Drs. H. F. Brewer, M. Maizels, J. O. Oliver, and Janet Vaughan, Medical Officers in Charge of the Emergency Blood Transfusion Depots at Luton, Maidstone, Sutton, and Slough, set up by the Medical Research Council on behalf of the Ministry of Health.

Since the outbreak of war considerable use has been made of "stored blood" for the treatment of civilian patients needing transfusion. Reports that stored blood has a somewhat greater tendency than fresh blood to cause reactions appear to have led to slight apprehension in certain quarters. We believe that at least some of these reactions may have been due either to faulty technique in the preparation of apparatus, the withdrawal, storage, or administration of blood, or to the use of unduly haemolysed blood, and that they should not be taken as condemning "stored blood" of itself. Blood has been distributed to a number of hospitals from the four Emergency Blood Transfusion Depots for London and the Home Counties, where the methods of collection and storage have been those outlined in the memorandum recently issued by the Medical Research Council. The reports returned have been uniformly satisfactory, although one observer, while appreciating the immediate restorative use in collapsed and exsanguinated patients, suggests that the tonic and anticoagulant value is less than that of pure blood.

Complete records of 160 miscellaneous cases—medical, surgical, and obstetrical—are available. They were given in all 219 pints of blood and were treated in forty-one different hospitals. The maximum amount any one patient received was six pints given as a continuous drip. Blood varied in "age" from a few hours to three and a half weeks. Group O blood was used in the majority of cases, but Group A and Group B blood were also provided on request. Slight rigors were recorded in ten cases, but in several such instances inquiry showed that the blood had been given cold. In three cases there was transient

jaundice; one patient passed red cells in the urine after transfusion, but the medical officer in charge was doubtful whether this could be attributed to the transfusion. No case of haemoglobinuria was recorded. No fatality proved directly attributable to the transfusion of stored blood has occurred.

We would like to stress the importance of the following significant points if optimum results in the use of stored blood are to be obtained:

1. The anticoagulant solution should be prepared with freshly distilled water from a clean still, and it should be filtered and autoclaved immediately.

2. All apparatus must be scrupulously clean. In the case of the rubber tubing a stiff wire carrying a swab or narrow elongated brush (for example, a 0.22 rifle-barrel cleaner) should be passed throughout its length, since mere washing under the tap is insufficient to remove small adherent pieces of clot. Rubber tubing freshly obtained from the manufacturers *must* be washed to remove the French chalk with which its inside is coated.

3. Strict surgical asepsis should be observed whilst actually collecting blood.

4. Storage should be carried out at 2° to 4° C.

5. Blood showing undue haemolysis should not be used. A zone of discoloration due to haemolysis extending above the corpuscle layer up into the supernatant citrated plasma for 1/2 to 1 centimetre or less (this occurs very occasionally with blood over seven days old) may be allowed, but greater degrees, including complete tingeing of the plasma, should be a definite contraindication to use.

6. Corpuscles and plasma may be mixed before the transfusion by as little and as gentle agitation as possible.

7. The blood should be warmed to body temperature before use; *the avoidance of overheating is equally important*. The highest temperature advised is 104° F.

The elimination of grouping errors as a cause of reaction is assumed.

L.C.C. SERVICES IN WAR TIME

The hospital and medical services of the London County Council and the efforts which are being made to carry on normal work in addition to the demands of the emergency are the subject of a statement issued by the heads of the departments concerned.

Hospitals and Special Units

At the beginning of the war all admissions to adult convalescent homes and hospitals had to be suspended, but one convalescent home—Princess Mary's, Margate—which had been evacuated and scheduled, is now resuming admissions, the Ministry of Health having intimated that it does not require any beds to be kept empty. Owing to evacuation of expectant mothers, the maternity units at the Council's general hospitals have been reduced from twenty-one to fourteen. The radiotherapeutic units for cancer at Lambeth and Hammersmith hospitals are in full operation. Stocks of radium have been put in a place of safety, but radium treatment will be available for cases in which it is considered essential. The admissions to the plastic surgery unit at St. James Hospital were suspended, but partial facilities have now been resumed. Additional plastic surgery units are being established under the Government scheme at certain emergency hospitals outside the metropolitan area. The mental observation wards continue to function normally, but at the other special units the numbers of patients under treatment have in some cases been considerably reduced as a result of evacuation. The puerperal fever unit at the North-Western Hospital is continuing as usual. Admissions to the fever hospitals and sanatoriums are continuing, but there are fewer cases. Five courses in fever instruction for medical students are at present proceeding.

Approximately 20 per cent. of the beds which had been allotted for casualties can now be utilized also for civilian sick. When the patients under treatment exceed this number, application is made to the group officer for some patients to be transferred to hospitals in outlying districts. Hospitals have been classified into five groups so that a reciprocal arrangement exists whereby any hospital can apply to another in the same group for any assistance it may need. Special arrangements have been made for a blood transfusion service within the Council's hospitals in addition to the one provided under the national organization.

Nursing, Midwifery, and Ambulance Services

The scheme for the training of nurses for the war period introduced by the General Nursing Council provides that in each sector all the hospitals, including fever hospitals and mental hospitals, shall be considered as one institution in each category for the training of nurses. Where possible, sister-tutors are to be evacuated with the trainees from vulnerable areas. The time spent by the trainees at the casualty clearing station is to be strictly limited, and arrangements are made to ensure that each nurse obtains the requisite experience in the various branches, if necessary by transfer from one hospital to another.

In order to cope with the anticipated increase in home confinements, due to reduction of maternity hospital accommodation, thirty additional temporary midwives were taken on by the Council, but the services of sixteen have already been dispensed with as the expected pressure in certain districts has not been realized. The Council's fixed establishment of domiciliary midwives is eighty-one. About 124 midwives from the Council's maternity hospitals have been drafted to the reception areas to assist in the confinement of evacuated expectant mothers. The number of confinements in London attended by the Council's midwives during the fortnight ended October 14 was 246; the number attended during a peacetime fortnight in August was 194. There has been a substantial increase in the number of confinements booked for the next two months.

The immediate effect of war conditions upon the ambulance service was to reduce the number of calls for general (that is, non-accident) cases and to increase those for accidents. On the outbreak of war the ambulance service was augmented in order to deal with the heavy increase in the number of casualties which might be expected if London were bombarded from the air. Many calls have been received as a result of accidents arising from the lighting restrictions.

Venereal Diseases and Tuberculosis Schemes

The L.C.C. venereal diseases scheme is being administered as completely as a reduced staff will allow. With the exception of that at Great Ormond Street Hospital all the clinics are functioning, and it is reported that the attendances in most cases are larger than were expected. At the Whitechapel Clinic during the first week of war attendances dropped from a pre-war level of about 1,900 to just over 1,000, but during the first week of October the attendance was 1,434.

The necessity for providing beds for war casualties compelled the evacuation of a large number of tuberculous patients; others were discharged at their own request. The total number so evacuated or discharged was about 1,500. The effect of the evacuation on the Council's special tuberculosis hospitals was to reduce the number of patients to 720 in seven institutions where the beds normally available number 1,400. The reduced number of beds necessitates a very careful selection in order that the best use may be made of the accommodation. There is, however, sufficient provision for patients with a favourable prognosis. Those not requiring specialized residential treatment and who have suitable home conditions are not being accepted for treatment in present circumstances. There is no waiting list for suitable patients, and a certain number of empty beds is at the disposal of the Council. The borough dispensaries are functioning more or less normally, except in a few cases where the service is curtailed. Provision has been made whereby all patients

receiving artificial pneumothorax treatment are handed the necessary particulars in a sealed envelope, to enable the treatment to be continued, whatever the area to which they may remove.

Mental Hospitals

One of the Council's mental hospitals has been closed for mental patients and is to be used entirely as an emergency hospital. Nine others are being used in part as emergency hospitals. The Maudsley Hospital, which deals with early cases of mental disorder suitable for treatment on a voluntary basis, has been closed because of its situation in the danger zone. The medical and nursing staff of the hospital have been distributed between the neurological units at Sutton and Mill Hill. It is hoped that the out-patient department of the Maudsley may be reopened before long, and a proposal is being discussed for the admission to the neurological units at Sutton and Mill Hill of a few patients who otherwise might have had treatment in the Maudsley Hospital itself. The out-patient clinics originally conducted by members of the Maudsley staff at three of the Council's general hospitals are still functioning.

It is mentioned as a matter of some interest that during the week immediately following the declaration of war the number of patients admitted to the mental hospitals on reception orders was 100, whereas in the corresponding week of 1938 the number was 62. Since the end of the week following the declaration of war, however, the average number of admissions has been 19 per cent. less than the pre-war average. Probably the sudden increase at the beginning of September was attributable to nervous tension, supplemented no doubt by a proper anxiety on the part of relieving officers to get the observation wards in London as free as possible of patients likely to be in danger if enemy activity should begin. Doubtless the clearance made during the first week is reflected to some extent in the falling off of admissions in subsequent weeks, but the postponement of expected trouble probably has also operated, and it may be that voluntary evacuation has removed from London some persons who might have been in need of care.

Mental Deficiency

The Mental Deficiency Acts are being administered in London as fully as possible. At the outbreak of war all examinations of and inquiries into mental deficiency automatically ceased. It has since been ascertained, however, that the Board of Control expects the administration of the Mental Deficiency Acts to be maintained, and it has been necessary to recall certain staff (medical and lay) to carry on essential work. Accommodation in the Council's institutions for the residential care of defectives is congested by reason of the overcrowding necessary to make room for emergency hospital beds, but it is considered that the Council should be able to provide for urgent new cases. Some 4,000 defectives are still under supervision in their parents' homes in London. The occupation centres were closed on the outbreak of war.

The work of examining blind persons under the Blind Persons Act ceased at the outbreak of war, and it has now been considered necessary to resume. For this purpose medical and lay staff have been recalled from the hospitals.

Since the early days of evacuation teachers in the reception areas, dealing with children from vulnerable areas, have been concerned at the growing inadequacy of the clothing which the poorer children brought with them. Summer dresses and suits and underwear, and thin shoes, have suffered seriously under the wear and tear of country life, and many of the children's parents are unable to make good the deficiency. The National Union of Teachers has made a practical contribution to solving the problem by making a grant of £1,000 for the purchase of clothing for the most necessitous cases. This money will be administered by the Save the Children Fund, which for thirteen years past has been collaborating with the National Union of Teachers in the distressed areas.

MEDICAL ASPECTS OF CONCENTRATION CAMPS

The Government White Paper[1] and newspaper summaries of it have given the world some idea of the conditions of life in the concentration camps for political prisoners in Germany before the war. To find parallels to these conditions it is necessary to go back to exceptional periods of unrest among Oriental or savage peoples. The documents in the White Paper are closely corroborated by much other independent testimony, and an interesting sidelight from the medical point of view is contributed to the *Catholic Medical Guardian* for October by a German doctor who was confined in the camp at Dachau.

The beginning of the imprisonment for many victims was, he says, a long journey in a train, into the compartments of which they were driven by the boots and rifle-butts of their S.S. guards. Twenty were crowded into a space made for ten and the doors and windows closed. On arrival at the camp they ran the gauntlet of two lines of guards armed with bayonets and clubs. They were then kept standing at attention on the parade ground for hours with no food or water or opportunity to attend to the calls of nature. Some had their ears permanently damaged, and some had blood-suffused eyes from beating on the head. Thereafter they were forced to work at the severest manual labour day after day, and the chief object of their guards seemed to be to inflict as much torment as possible. The drinking of water was forbidden throughout the day; the loads were calculated to be beyond the strength of the workers; the guards kept up a rain of kicks and blows. Prisoners who broke down were sent to the punishment squad. Heads were bare in high summer; clothes were continually wet in winter.

Diet and Punishment

The diet supplied on the average between 1,200 and 1,500 calories a day. The usual morning allowance was a quarter of a litre of black unsweetened acorn coffee, with no nourishment value. The prisoner took to work such bread as he might have saved from the day before. His evening meal was usually soup, containing 300 grammes of potatoes, cabbage, or beans, with 300 grammes of black bread. Occasionally the issue was supplemented by 50 grammes of black pudding, or by a little jam, cheese, or syrup. Fat was almost completely absent; pulse of various kinds was common. Sanitation was relatively satisfactory in Dachau, but in Buchenwald it was abominable. Though dysentery and enteritis were common, the latrines could only be used at certain hours of the day. Clothing and shelter were miserably insufficient.

In addition to the individual brutality of the guards, formal punishments included flogging, suspension from trees, and solitary confinement in darkness. Flogging was standardized at twenty-five lashes with a steel rod or ox penis on the buttocks, after which the prisoner must stand at attention facing a wall for twelve hours without eating or drinking. Huge haematomata developed around the wounds, and fever, whether of resorption or suppuration, followed. For tree-hanging the prisoner had his hands tied behind his back. At first the pain was agonizing, owing to the strain upon the brachial plexus and the cutting of the chains into the skin; the body gradually stretched owing to the elasticity of the intervertebral disks, and the sensation was that of being torn asunder by the legs. The acutely painful phase was followed by paraesthesia and then by a sensation of paralysis; the muscles then became lifeless and the backs of the hands oedematous. The suspension usually lasted an hour and a half, and for days afterwards the hands and feet were stiff and unfeeling.

Psychological Features

On the psychological side, says this writer, neurosis is endemic, and takes the form of anxiety, ruthless egotism, or despair. The ordinary prison neuroses are rare, as the captives are mostly innocent of crime. Queerly enough,

[1] Cmd. 6120. London: H.M. Stationery Office. (3d.)

physical neuroses, especially of the gastro-intestinal tract, improved in spite of extremely indigestible food. The author therefore thinks it a safe generalization that the best cure for this class of nervous disorders is "authoritative and imperative suggestion therapy." The psychical injury which does not express itself in physical symptoms must, however, be incalculable. The author makes some reflections on the possible effect which their occupation may have on the minds of the youths who are specially selected and taught the technique of cruelty to defenceless men which is a necessary qualification for the S.S. guard. It is a melancholy thought that 7,000 young men are posted to Buchenwald at a time and that any tendencies to sadism they may have are given full opportunity for development. Parties of Hitler Youth are taken through the camps, and one of the functions of these institutions seems to be to brutalize the German youth of military age. The student of morbid psychology would find an ocean of material in unexpurgated accounts of these camps which for reasons of decency cannot be published. The colossal work of undoing the spiritual harm that is being wrought among victims and guards alike baffles the imagination.

Medical Treatment

Generally speaking, this writer found medical treatment perfunctory. At the worst the sick were driven to work and left to die where they dropped. Occasionally obvious complaints like a "struma" or hydrocele were treated and the patient allowed lighter work. Duodenal ulcers, weak hearts, active tuberculosis, and diabetes were disregarded. Patients in hospital were left entirely to the mercy of the orderlies or of fellow prisoners doing supervision duty. A certain amount was done on the surgical side: palmar phlegmons were cut out, and compound fractures of the hands and feet caused by accident or violence were treated by amputation. A civilian dentist gave some treatment at Dachau, but in Buchenwald not even extractions were performed; periosteal abscess and caries were extremely common. Innumerable dirt diseases, such as impetigo, furunculosis, erysipelas, eczema, and infective fungoid diseases, were rife, and, owing to the lack of vitamins and rest, wounds healed with difficulty. The sick, even those unable to walk, were dragged to roll-call twice a day by their friends. A common complaint was oedema of the backs of the hands and ankles. In Dachau large numbers suffered from tenosynovitis. In Buchenwald hundreds of prisoners caught an acute itching dermatitis of the edge of the pinna, due either to a fungus, silica dust, or allergy produced by the nettle-fibre blankets. It yielded to painting with a zinc solution. There was, of course, a wide variety of disease not attributable to the camp conditions, but a very large number of acute cases were fatal—perforated appendix, ileus, cancer, and pneumonia. In the opinion of the author 80 per cent. of the deaths could have been prevented by proper medical attention.

Moral Fortitude

A few items are recorded on the positive side. Some prisoners were able, by submission to the discipline and by developing the habit of enduring privation, to school and strengthen their characters. The White Paper mentions the *Bibelforscher*, members of a religious sect who were almost as badly treated as the Jews, but whose courage and religious faith were remarkable and who professed themselves ready to suffer to the utmost what they felt God had ordained for them.

Hunger and work appeared to agree fairly well with some of the diabetics, who although they received no insulin showed no sign of coma. Some of them had lost as much as 80 lb. and still felt fairly well. Almost all sufferers from psoriasis were strikingly benefited. Colds were rare. All prisoners dreaded the camp hospital with its appalling death rate, and the will not to be ill must have strengthened their weakened organisms.

The question that remains in the mind after reading these terrible reports is why those in power should find it necessary to expend so much trouble and ingenuity in heaping gratuitous torment on thousands of helpless people.

Local News

FRANCE

[FROM OUR CORRESPONDENT]

War-time Organization of Medical Practice

The decree-law of September 12 places all those doctors who are not already at the disposal of the Ministry of National Defence at the service of the Ministry of Public Health. In other words, all French doctors, men and women, come under the national defence scheme and are in a sense mobilizable if not actually mobilized. There are approximately 30,000 doctors in France; between 25,000 and 26,000 are in practice and the remainder are attached to certain special services or have retired from practice. Those doctors who remain civilians but who may be called on to go anywhere to fill gaps created by the calling up of their colleagues for army service may well experience difficulties in adjusting themselves to new conditions. It is indeed inevitable that this gigantic reshuffle should create much searching of heart, not least among the doctors who are serving in the army at 70 francs a day and who are naturally wondering what is happening and what will happen to the practices they have left. In these circumstances it is fortunate that there exists a mutual aid society, Sou Médical, to which some 9,000 doctors belong. In peace time it defends the professional and material interests of its members, and now, in war time, its staff of experts is busy solving also the war-time problems of its members.

Hospital Reform

The new law governing the public hospitals in France is a brave attempt to bring into one comprehensive scheme a tangle of public and philanthropic hospital activities dating from many generations back. For centuries gifts and legacies for the benefit of the sick poor have been administered with an independence inspired by a parochial rather than by a national outlook; hence the faults of overlapping and of lack of co-ordination. When the status of the public hospitals was legally defined in 1851 the inmates were the indigent sick, precisely those persons for whom charitable legacies were intended. Now, with hospital treatment sought by almost every class, the need for a fair distribution of hospital charges between various bodies, central and local, has become imperative. The new law introduces certain necessary reforms and codifies the rules and regulations. Principles are laid down governing the selection of patients seeking admission to hospital, and the administrative bodies responsible for the functioning of the public hospitals are reorganized, attention being paid to the representation of the medical profession and the insurance societies on the administration committees of hospitals with more than 200 beds each. Provision is made for co-operation between hospital administration and the teaching of medicine. For the better distribution throughout the country of hospital facilities, all plans for erecting new hospitals and modifying old ones must be approved by the Ministry of Public Health. Small local hospitals and certain institutions in the large towns will, however, be exempt from the paternal interference of the central authority. Facilities will be provided for the suppression of those hospitals and allied institutions whose conduct has not been found to be in conformity with modern standards of hygiene. There is also to be a tightening up and unification of the rules governing the appointment of the medical staff of the public hospitals.

Professor Leriche on Amputation Stumps

In *La Presse Médicale* for September 13 and 20 Professor René Leriche of Strasbourg comments disconcertingly on the shortcomings of the amputation stumps of the last war. About 16 per cent. of the 80,000 patients amputated in the period 1914–18 had to be re-amputated, sometimes more than once. "Retouching" was necessary in 31 per cent. of

the total, and as for the amputations of the lower limbs 50 per cent. of the patients had to be operated on afresh for the satisfactory adjustment of artificial limbs, etc. A few of the secondary operations were necessitated by the development of osteitis or painful scars, but in the opinion of Professor Leriche the chief trouble was the inability of the operating surgeon to think in terms of modern prosthetics. When the operator follows the dictates of the most orthodox textbooks, showing a brilliant mastery of technique but encountering the disapproval of the prosthetic surgeon and of the patient himself some months hence, it is the operator and not the prosthetic surgeon whom Professor Leriche blames. He reviews the various amputations of the limbs in the light of the experiences of the last war, and shows how they have robbed many a classic operation of its prestige. Chopart's disarticulation, for example, has been found to be worthless in 95 per cent. of cases, and the same may be said of many another operation sanctified by textbooks.

Reports of Societies

FAULTS OF MEDICAL LITERATURE

Sir Robert Hutchison's Lecture

The David Lloyd Roberts Lecture was delivered before the Medical Society of London on November 16 by Sir ROBERT HUTCHISON, President of the Royal College of Physicians, whose subject was "Medical Literature."

The lecturer began by glancing at the vast amount of contemporary medical literature. It had been estimated that there were over five thousand medical periodicals in the world. In this country there were about 130, and here the yearly crop of medical books was over 400. The mere question of storage was itself a problem. In the library of the Royal Society of Medicine room had to be found for 3,000 new volumes each year, taking up shelving 60 ft. in length and 8 ft. in height. More serious was the effect of all this proliferation upon the interchange of knowledge. It was increasingly difficult to find the needle in the haystack. Facts might be said to be buried rather than recorded. It was almost physically impossible for anyone to follow Bacon's aphorism: "When a man addresses himself to discover something he first seeks out and sees before him all that has been said about it by others." Science seemed likely to be suffocated in its own secretions.

After recounting the familiar jest about stacks of unopened journals in consulting rooms, Sir Robert Hutchison said that current medical literature could not be permanently ignored with impunity, and he quoted Osler as saying, "The doctor who does not use books and journals, who does not need a library, who does not read one or more of the best weeklies and monthlies, soon sinks to the level of the cross-counter prescriber, and not alone in practice but in those mercenary feelings and habits which characterize a trade." All the busy practitioner could do was to tear out from his weekly journal those articles which interested him and had a direct bearing on his work and file them. In that way, with proper indexing, he could build up a useful collection. If in addition he got every year such a publication as the *Medical Annual* it should not be difficult for him to keep reasonably up to date. The contributor to medical literature needed something more—a clue through the labyrinth—and the *Quarterly Cumulative Index* was an excellent guide.

When the required articles had been found they had still to be read and abstracted, a laborious business which nowadays required a considerable knowledge of languages. He looked with no great favour upon the preparation of bibliographies and abstracts by professional librarians, who, however skilled in the business, had no medical training and could not be expected to know the relative value of different papers nor the points which should be picked out. The work of the literature hunter would be easier if there were more periodical publications of the type of the German *Zentralblätter* and *Jahresberichte*. The ideal would be an international clearing house in which the whole periodical literature of the world would be sifted by experts and summaries made of such papers as contained any original as opposed to merely repetitive or didactic matter.

Measures for Stemming the Flood

But the root of the difficulty—the immense bulk of raw material to be dealt with—would still remain untouched. What was it that prompted doctors to write? The motives were mixed: some reasonable and creditable, others less so. Good reasons were the necessity for putting on record new observations or results of experiments and the impulse to teach. Bad reasons were the desire for prestige and priority. He remembered at a meeting of the British Medical Association many years ago Lawson Tait holding up a copy of the *Journal* and saying that he divided it "into the intra-professional and the extra-professional advertising portions." That was grossly unfair. After all, the only way in which a young man could let it be generally known by his colleagues that he possessed special knowledge or skill in any department of work was by contributions to the professional journals. One must draw the line, however, at the publication of the same paper in more than one journal and at the equally reprehensible practice of sending out reprints wholesale.

Another motive for writing which was of doubtful validity was the desire for "self-expression"—a form of mental exhibitionism. No doctor would surely desire a better epitaph than the one recorded of a member of the surgical staff of the London Hospital in the eighteenth century, that he was "guiltless of any contribution to medical literature." Sir Robert Hutchison equally deprecated ceremonial orations, presidential addresses, and memorial lectures, such as he was then delivering. "Surely there are better ways of remembering the dead than by boring the living."

He suggested a strict birth control in regard to new journals. The amalgamation of existing journals might well be carried out in many cases. Some journals might be suppressed altogether, among them those which appealed only to a local patriotism. There were five such local journals in England alone, and others in Scotland. Superfluous journals led to superfluous writing, and editors were driven to tout for contributions, whereas it was the writer who should woo the editor. The ideal current medical literature for this country would consist of one good weekly journal catering especially for the general practitioner, which would contain articles mainly clinical in character, but also critical reviews and abstracts of the work published in the more specialized periodicals here and abroad. In addition each special branch of medicine should have a journal, but not more than one, appearing at longer intervals for the publication of original work in that sphere.

Stricter editing was also desirable, involving the refusal of many articles that at present found their way into print, and the cutting down of others. Almost everything was too long—lectures, speeches, sermons, and books. Powerful astringents might be required to check the verbal diarrhoea which afflicted so many writers, but it was the editor's business to administer them.

On the Writing of Books

The over-production of books was as great a nuisance as the multiplication of journals. The publishers were largely to blame. In their rivalry with their competitors they easily persuaded young would-be authors to write for them, and recouped themselves for their many failures at the expense of the more successful. It would be a great gain if, instead of issuing expensive and elaborate

textbooks, publishers would provide more concise, fully documented monographs giving a complete account of present knowledge in a limited field.

Sir Robert Hutchison also criticized the dullness of medical literature, the excess of facts and comparative absence of ideas, generalizations, and hypotheses, so much recording and so little reflection. The dullness was curious considering that the subject-matter was so interesting.

"A medical textbook might well be like one of those omnibus volumes of 'Detection, Mystery, and Horror,' for, after all, diagnosis is detection, disease is often mysterious, and, heaven knows, our work is full enough of horrors, but, as it is, the average textbook is about as readable as a telephone directory. Take, for instance, the biography of a red blood corpuscle from its birth in the bone marrow, with its capillary wanderings and its moving adventures by flood and field to its normal gradual old age and burial in the spleen or to its tragic end in a haemorrhage. It might be made a vivid Odyssey, but how dull it all sounds in a textbook of physiology—as arid and sterile, as dry and dusty as the sands of the Sahara."

Medical writers also fought shy of humour. They did not agree with the Virgilian tag that in order to speak truth it is not necessary to pull a long face. Yet a writer had never really mastered his material until he could jest about it.

The lecturer complained that one of the unfortunate results of the increasing specialization of knowledge was that the writings of workers in one department were often hardly to be understood by those outside it. Many papers on medical psychology, biochemistry, or iatromathematical subjects might, so far as he himself was concerned, just as well be written in Chinese. In addition to being prolix and obscure, medical literature exhibited only too often an absence of any sense of style or even of grammar. The average of medical writing was probably not so high now as it was last century. Certainly there were no textbooks like those of Michael Foster, Fagge, or Osler, and the modern multiple productions which had succeeded them had lost the individual touch. Much of the didactic writing of old days was in lecture form, and lectures, although the modern publisher did not favour them, were usually more readable than the formal textbook. One reason for slovenly writing was dependence on the stenographer and the dictaphone. A deeper reason was a defective literary and linguistic education. The great models of English prose were probably less read by the younger generation, and a literary diet of newspapers, detective novels, and the productions of scenario writers was no substitute for them. It was deplorable that in an examination of the standard of the M.R.C.P. it should have been found necessary to drop Latin and Greek because almost no candidate in recent years had ever attempted the comparatively simple translations from these languages, while very few showed even any knowledge of German. It might be said that style was of less importance than matter, but that was too superficial a view. As Allbutt said: "The man of science ought best to know that style and matter can no more be dissociated than skin and bone; but if we write clumsily, loosely, or disjointedly our thoughts are accordingly."

At a special meeting of the council of the Medico-Legal Society recently held, the following decisions were arrived at: (1) To suspend the ordinary meetings of the society for the time being, but to review the situation from time to time in the hope that it may be found possible to hold occasional meetings or to resume the normal activities of the society. (2) To cancel the annual dinner which was to have been held in December next. (3) To continue the publication of the *Review* and the annual subscription of £1 1s. until the end of 1940, both these matters to be again reviewed before the expiration of that period. An emergency committee has been appointed with all the powers of the council and with power to add to its number from members of the council.

Correspondence

Anaesthesia in War Time

SIR,—Your leader on anaesthesia in war time (*Journal*, November 11, p. 958) must appeal to all practical anaesthetists, and more so to those specialists who have been teaching postgraduates and students since the last war. You do not, however, stress one fact—the difference between work at the base hospitals and that near the front. The former should be similar to that in the general hospitals in ordinary civil life, and can easily be disposed of by appointing a specialist anaesthetist to, say, every 500 beds, with several juniors to help him. Even so, it is possible to criticize some of the arrangements at these improvised hospitals in such matters as uncovered exits from the theatres, the complicated apparatus provided, and the enormous cylinders of gas and oxygen (potential bombs).

At the front anaesthesia must be different. Conditions prevent the storage of innumerable cylinders of explosive gases. The wounded are shocked but have not suffered from prolonged sepsis and interference with their carbohydrate diet, and are generally heavily doped with morphine; such cases are notoriously easy to anaesthetize, requiring but little anaesthetic to produce the light anaesthesia which is all that is necessary. Such an anaesthesia is easily obtained by ether or chloroform on an open mask, or by air blown through a couple of Junker or Boyle's bottles in tandem containing ether and chloroform. A steady stream of air can easily be obtained by hand or foot bellows attached to a net-covered rubber bag inflated against pressure. Air as a vehicle for ether and chloroform is not so good as N_2O and O_2, but is very efficient, easily used, and safe.

As you so pertinently remark, everyone attempting to give anaesthetics nowadays should possess and be able to use his own bronchoscope. Ether, or even chloroform, and air without positive pressure are easily given by the intratracheal route with very simple apparatus and without the use of cylinders. These remarks are not intended to apply to those special C.C.S. which came into existence before the end of the last war dealing with abdominal, chest, or head work; specially skilled anaesthetists should be attached to these, and they will each have their own methods of dealing with such work.

Avertin is portable and easy to prepare and use. Very little ether is required to produce anaesthesia, but it requires experience to obtain the best results after the use of opiates.

A word of warning about the intravenous barbiturates: some of them contain sulphur; many of the septic cases will be given prontosil or sulphapyridine; as everyone knows, these compounds and sulphur are incompatible, but the presence of sulphur in some barbiturates is not so generally understood.

Your article is full of common sense and will be read with satisfaction by many who, like myself, are not afraid to use chloroform under war conditions, or, indeed, in the comparatively few suitable cases at all times.—I am, etc.,

London, W.1, Nov. 14. Z. MENNELL.

SIR,—As much of my time during the last war was devoted to the administration of anaesthetics I have been greatly interested by the leading article on anaesthesia in war time in the *Journal*. The article raises many points of interest and some issues to which the immediate attention of the profession should be drawn. May I briefly discuss the issues raised as they occur.

1. If a general practitioner is to be called to a work whose scope is far beyond his peace-time duties he should so prepare himself that his anaesthesia is both safe and good; if he cannot get immediate practical experience he should at least in spare moments study some not-too-bulky book upon anaesthetic practice and the modifying physiological forces of anaesthesia and the nature of anaesthetic drugs.

2. How far modern refinements in apparatus are superior to the anaesthetic equipment of 1914–18 I do not know, but

the technique of anaesthesia must still be much the same, and ether, either open or closed, must still be regarded as the method of choice, removing the fear of primary syncope, secondary syncope, and reflex syncope.

3. I believe the dangers of chloroform, though really true, have been exaggerated partly owing to very faulty administration, especially during the early stages of induction—how often one has seen this drug literally "poured" on to the mask! But in view of possible civilian casualties we must remember that it is still the anaesthetic of choice in children under the age of 6 years.

4. The disfavour shown nowadays towards C_2E_3 is rather curious in view of its suitability for children between the ages of 6 and 10 years, for old people, and the powerful or alcoholic subject who responds so badly to open ether.

5. In the use of anaesthesia in cases of shock no mention is made of what used to be taught as a highly satisfactory method of induction—namely, closed ether.

6. A point which might be kept in mind, especially in connexion with first-aid posts, is the highly explosive nature of ether and the importance of avoiding the presence of a naked light or flame, especially in these sand-bagged days.

7. Closed ether given from a Hewitt inhaler seems to me as safe as any anaesthetic could possibly be if properly given—an item to be remembered in connexion with first-aid posts.

8. I wish that all who teach and demonstrate the science of anaesthetics would put up three large "N.B.s"—namely, (*a*) remember the significance of and difference between the conjunctival and corneal reflexes; (*b*) remember the importance of air in all anaesthetics; and (*c*) never forget the evil of conversation and a mind astray.—I am, etc.,

AUSTIN PRIESTMAN,
Medical Officer of Health and
Folkestone, Nov. 14. School Medical Officer.

SIR,—The reading of your leading article on anaesthesia in war time in the *Journal* of November 11 (p. 958) recalls to my mind a simple, agreeable, and relatively safe method of administration of a chloroform-ether mixture that I was in the habit of using frequently many years ago. It was originally introduced into this country, I believe, by Dr. W. J. McCardie of Birmingham. The principle is as follows. Into an ordinary Clover's inhaler is poured a mixture of 1 part by volume of chloroform to 2 parts of ether. A rubber bag can be used for a short time during the period of induction only. The strength of the mixture is controlled solely by the rotation of the cylinder, and the face-piece is not removed at all during the operation except for necessary refilling. There is no rebreathing and coughing is reduced to a minimum.—I am, etc.,

Guildford, Nov. 16. H. F. PARKER.

SIR,—In view of recent correspondence on the danger of chloroform anaesthesia and of your leader in the *Journal*, it may be of interest to note the all-inclusive statistics of deaths under anaesthetics contained in the Annual Reports of the Registrar-General for Scotland. In that for 1936, Table 30, page xciii, the following figures are given:

DEATHS UNDER ANAESTHETICS (SECONDARY CAUSE)

Ether alone 35, in various combinations 34	= 69
Chloroform and ether 30, in various combinations 1	= 31
Chloroform alone 14, in various combinations 2	= 16
All other anaesthetics—volatile, local, basal, etc.	= 49
Total	165

Regarded superficially these figures do not seem to justify the claims made for the safety of ether and the danger of chloroform. Exact analysis is, of course, impossible in the absence of knowledge of the frequency of administration of different anaesthetics and of the selection of anaesthetics for types of patients or of cases.

The reports for the years 1931–6 show little variation in the total number of deaths from anaesthetics, but indicate that deaths from chloroform have tended to fall while those from ether have tended to rise. Presumably this has resulted from a less frequent use of chloroform and a more frequent use of ether. If this is true, however, it would indicate that the chief factor in deaths under anaesthesia is not the choice of the anaesthetic but the type of illness and of patient.

Perhaps some of the anaesthetists or "the detached observer" of your leading article would care to comment on these figures.—I am, etc.,

Loanhead, Midlothian, Nov. 13. W. HAMILTON.

Treatment of Gas Gangrene

SIR,—In an interesting letter (*Journal*, November 11, p. 973) Mr. W. A. Cochrane refers to the value of radiographs in the diagnosis of gas gangrene. I should like to call attention to the beautiful photographs by Dr. Agnes Savill and Miss Vera Collum which illustrate a paper I read in the Section of Surgery of the Royal Society of Medicine on December 13, 1916 (*Proc. roy. Soc. Med.*, 1917, **10**, 29). The paper was based on an analysis of 107 cases of gas gangrene, of which a large number came from the battle of the Somme on July 2, 1916. In it I made the observation that some help in coming to a decision as to treatment might be obtained from a minute study of the *x*-ray plate; and commented on the advisability of treatment by incision in early cases and by excision of an affected muscle when necessary, amputation being reserved for mass gangrene. Thanks to the kind co-operation of Dr. Weinberg and M. Séguin of the Pasteur Institute I was able to employ a potent polyvalent serum (*B. perfringens, Vibrion septique, B. oedematiens*) in some cases with strikingly successful results. It happened sometimes, however, that after the gangrene organisms had disappeared death took place from streptococcal infection. It seems probable that had sulphapyridine (M & B 693) been then available a fatal issue in these cases might have been averted.

In the diagnosis of gas gangrene the characteristic putrid odour is unmistakable, and has since enabled me to recognize the presence of a gas infection in a neglected maternity case. In a typical case progressing to a fatal termination the lemon-yellow coloration of the skin, a subnormal temperature, haemorrhagic vomiting, and dyspnoea are present. The patient may talk naturally, eat well, and is generally conscious almost to the end.

May I make a strong protest against the plaster-of-Paris treatment of infected wounds suggested by Dr. Trueta. Some of the very worst cases I had under my care had been encased in plaster-of-Paris, and arrived with the swollen tissues bulging above the plaster. Any pressure should be avoided, and the one flaw in the Thomas splint lies in the pressure from the shoulder or thigh ring.—I am, etc.,

FRANCES IVENS-KNOWLES.

Killagorden, Cornwall, Nov. 15.

Gas Injuries to the Eye

SIR,—I welcome Dr. Redmond Roche's letter in your issue of November 18 (p. 1019) relating to my correspondence on the above subject which appeared in the *Journal* of November 11 (p. 972). It gives me an opportunity to clarify the confusion that apparently exists in the minds of many regarding this subject, and which is so clearly reflected by the nature of Dr. Roche's letter.

First, a clear differentiation must be made between immediate treatment and that of the established injury. This letter is concerned solely with immediate treatment, and under active service conditions.

Secondly, it must be presumed that correspondents on the subject possess an elementary knowledge of the properties and action of mustard gas. The confusion which apparently has arisen is due, I feel sure, to lack of knowledge of the fundamental principles involved. It is manifestly impossible in the space of your correspondence columns to deal with the subject at any length. I will, however, outline a few of the salient features of a mustard-gas lesion of the eye, so that it may be easy to understand the rationale of the treatment advocated.

Very briefly, mustard gas is a liquid which volatilizes slowly. It is a cell poison, local in its action, and is absorbed

into the lipoid of the tissues with *extreme* rapidity. In so far as the cells of the cornea are concerned the action of this gas may be described as instantaneous—a statement which is based on the following experimental findings. If drops of liquid mustard gas are simultaneously placed on the cornea of both eyes of an animal and one eye is immediately thoroughly irrigated, with everything to hand under the most advantageous conditions to carry out "first aid," while the other eye is left for Nature to deal with, the lesions of the cornea in both eyes, when examined macroscopically the next day, are indistinguishable from each other. Histological changes have been shown to occur within a very short space of time after contact, and progressively develop. This progressive development of the lesion is one of the features of the gas and consequently makes it such a valuable chemical warfare agent. When we are able to defeat this subtle action and prevent a lesion developing mustard gas will cease to be used in war.

Other points which require particular emphasis are the period of delay which always occurs before the injury becomes evident and the absence of pain during this period. The actual latent period will depend mostly on the concentration of the gas and the duration of exposure. Lack of appreciating this peculiar action has, perhaps, led many to suggest a line of treatment who with a deeper knowledge of the subject would not otherwise have done so. Research workers all over the world have been assiduously studying the problem of the immediate treatment of mustard-gas lesions for years. Many avenues have been explored and it is hoped that this work will continue, but so far no therapeutic agent has been discovered that will counteract the action of the gas on the delicate tissues of the eye once the cells have been penetrated. There is no first-aid treatment that can compete with Nature's rapid and complete removal of unabsorbed mustard gas—reflex action of the lids and immediate flow of tears—as shown by laboratory experiments. Further, no therapeutic agent will influence the development of a lesion in those cells of the cornea already affected. The damaged tissues are devitalized, which is another prominent feature of the poisoning.

For these reasons immediate treatment must be palliative. It should be aimed at allaying irritation ("suicidal pain," Dr. Roche might note, is not a feature of a mustard-gas injury), counteracting spasm, and above all preventing septic invasion of the devitalized tissue. This may best be achieved by the use of perfectly bland sterile lotions and, following this, the instillation of a drop of sterile liquid paraffin to prevent the lids sticking together and so to permit free drainage from the eye.

Dr. Roche will find this treatment, together with the points I have outlined, detailed in all the official manuals on the subject, and also in my article in the *British Encyclopaedia of Medical Practice*, vol. **5**. Greater detail in so far as the eye is concerned is discussed in an article by me in *Modern Trends in Ophthalmology*, which is at present in the press. Publication of this latter book has been delayed owing to the war, but reference to my article, and in particular to the experimental findings mentioned above, was made by Mr. Arnold Sorsby in a paper which he read in opening a discussion in the Section of Ophthalmology at the B.M.A. meeting held at Aberdeen this year.—I am, etc.,

War Office (A.M.D.7), Nov. 17. L. T. POOLE.

SIR,—Considering the importance of mustard gas in the event of aerial activity, it is surprising that no attempt seems to have been made to obtain a "pool" of experience in this devastating injury. It would appear advisable to issue definite instructions as to treatment in order, at least, to prevent further damage from unwise interference. I would like information from those who have treated many cases regarding the following points:

1. Lavage by saline, sodium bicarbonate solution, and similar lotions is only possible at an early stage before swelling. Even so, how can it remove an oily liquid? Surely the only fluid capable of removing any excess must itself be oily. Irrigation has been impossible in the few cases I have seen, but these were not early. Surely irrigation increases spasm.

2. For spasm and pain sterile atropine appears useful. Should it be a routine? If so, between which ages?

3. Cocaine appears contraindicated entirely. What of holocain and similar drugs?

4. Dionin would appear ideal considering the hyperaemia produced by it and the tremendous devitalizing action of mustard gas, but many patients complain bitterly of the irritating burning pain following instillation of dionin.

5. Should ointment be used? Does it hold up secretions or not? The only agreed fact appears that bandaging is undesirable. Surely it is advisable to have some really authoritative teaching on these points in place of theoretical discussions. Can't we do anything for the pain?

Dr. A. Francis's experience (*Journal*, November 11, p. 972) with "dielectric oil" is most suggestive, while Professor J. H. Burn's information (November 11, p. 972) regarding the use of cod-liver oil by the German Army Medical Service is surely indicative of German thoroughness. If we have anything definite as the result of our own research it would be interesting and useful to have it made available for all.

So far official instructions in the publications I have read seem more in the form of vague suggestions, tending to imply that eye injuries from enemy action in the air are of slight importance. At the present moment symptoms are still arising from mustard gas of the last war. It must be remembered that any irritation produced may subside for nearly half an hour before the acute inflammation begins. What can be done in this important latent stage?—I am, etc.,

Lytham St. Annes, Nov. 11. WILLIAM WILSON.

SIR,—In the absence of any indication that either oils or salines neutralize mustard gas, their relative merits would seem to be a biophysical problem. From this viewpoint it would be interesting to know whether osmotic influences can affect the movement of a substance which is in solution in the tissue lipoids; and, similarly, whether the application of, say, castor oil will result in the transference of lipoid-dissolved substances from the tissues to the castor oil. If this latter possibility were true, irrigation of the conjunctiva with oils would be indicated.—I am, etc.,

Nov. 13. R. B. TERRY.

Fatal Pulmonary Embolism in Fractured Neck of Femur

SIR,—In connexion with the excellent article on fractures of the neck of the femur by Mr. Philip Wiles (*Journal*, November 4, p. 920), I would draw attention to five fatal cases of proved pulmonary embolism from treatment of basal and trochanteric fractures in old and elderly female subjects which have come under my notice in the last two years. In these subjects the complication took place in the usual types of basal and trochanteric fractures—that is, in those with lateral rotational displacement of the distal fragment and in the comminuted impacted type.

In considering how this condition of embolism might have been anticipated and prevented in these cases, one feature of significance appears to have been that treatment was undertaken about the same time in each case—namely, a week to ten days after the accident. If a thrombus is present, this seems to be the dangerous period for dislodgment. Two of the fatalities actually occurred in the operating theatre before any attempt to administer an anaesthetic or to reduce the fracture had been made. Both patients complained of breathlessness and of a feeling of restlessness and oppression on the way from the ward to the theatre, death taking place in a few minutes after being lifted from the trolley to the table. The other three patients all died a few minutes after gentle reduction of the fracture under a general anaesthetic while the surgeon was waiting to inspect the post-reduction films prior to immobilizing the limb.

At necropsy the damage to the bone, the extent of the extra-osseous injury, and the size of the haemorrhages which

had taken place were far greater than might have been imagined probable or possible. Thrombosis of the circumflex veins was present and extended into the femoral and external iliac veins. The lifting of two of the patients out of bed and then removal to the theatre was enough in itself, therefore, to cause the condition of fatal pulmonary embolism.

It should be emphasized that all the cases were in elderly and old women of 65 years and over. In these cases lifting and moving of the patient and/or the attempted manual reduction of the fracture are particularly dangerous at a period of a week or ten days following the accident. It may be submitted that, if interference is to be contemplated at all (and this point in itself must be carefully weighed in the individual case) in basal fractures occurring in the elderly, then it should be undertaken at once, before thrombosis has occurred, or only after some weeks, when danger of moving a thrombus is past. In the elderly, early gentle traction in a Thomas splint as described in the article, or in Jones's hip-abduction frame, would seem to be the safest method if, in spite of the risk, it is decided that displacement is to be corrected. I have no personal experience as to whether pulmonary embolism is a serious risk in the treatment of basal and trochanteric fractures occurring in the young or middle-aged adult.—I am, etc.,

Edinburgh, Nov. 8. W. A. COCHRANE.

Treatment of Fractures

SIR,—I have read with interest Mr. R. Watson-Jones's letter on this subject (*Journal*, October 21, p. 826) and must agree with him that the method described by Professor Trueta for the treatment of infected fractures cannot be regarded as revolutionary. The principles of the treatment of infected fractures—excision, cleansing, drainage, non-interference with the wound, and immobilization of the limb—remain the same. The fact that a closed plaster cast is applied does not exclude drainage. I have been using Professor Trueta's method for about ten years, but have not had the opportunity of making observations on such a large scale. In some cases I cut a window in order that the superficial gauze covering of the wound can be changed to avoid the smell becoming too offensive. In spite of the window, healing of the wound and union of the fracture were never delayed. In my opinion the success of the treatment depends on proper immobilization of the limb and non-interference with the wound after the initial dressing.—I am, etc.,

London, W.1, Nov 14. E. GOLDSCHMIDT.

Traumatic Dislocation of Patella

SIR,—Having myself twice suffered from this very painful dislocation, the article by Mr. E. P. Brockman (*Journal*, November 11, p. 963) prompts me to relate my experiences, particularly as I find that there is very little information about it in the standard textbooks.

The first occasion on which it occurred was at school on the rifle range, and was due to a forcible rotation of the knee-joint while falling prone. I have very little recollection of the actual process of reduction, but remember that it was done in a sitting position. The second occasion was quite recent, and was due to tripping over a hassock in the dark. After two very painful and unsuccessful attempts at reduction in the recumbent position, my wife was able to reduce it quite easily by gentle extension on the foot accompanied by internal rotation, as soon as we realized that I had to sit up in order to relax the quadriceps. I found that the only way in which it was possible to sit up was to force myself up by pressing with both hands behind my back on the floor. Any attempt to sit up without using the hands of course makes matters worse by tightening the quadriceps, and is, moreover, exceedingly painful.

It is my impression that a great deal of the pain in this dislocation is caused by quite understandable attempts on the part of the patient to sit up to reach his injured knee, and in part also by external rotation of the tibia on the femur from the pull of the displaced patellar tendon. This pain is quite sickening, and similar, I imagine, to that experienced in injuries to the menisci, and is possibly caused in the same way, under the stress of the rotation.—I am, etc.,

Wivenhoe, Essex, Nov. 11. WALTER RADCLIFFE.

A Drop-wrist Splint

SIR,—Mr. John Sainsbury, in his letter in your issue of November 18 (p. 1021), wastes his time in criticizing one of the illustrations to my short article in the *British Medical Journal* of November 4 (p. 914). I admit it would have been better to have shown the apparatus fixed to a case of drop-wrist, but the photograph was taken quite recently and no such case was available at the moment. Therefore a normal subject was used and happens to have taken a very energetic hold of the end of the splint. The illustration was meant to show only the method of fastening the splint and not the poise of a paralysed wrist. I think this is indicated in the letterpress.

In actual application to a crippled hand the bases of the middle phalanges rest on the wooden roller, the essential elevation of the first phalanges being thus provided, while the fingers remain only slightly curved as in the normal position of rest. Anyway, the proof of a splint is in the wearing thereof, and this splint was found to be efficient, comfortable, and economical in nearly a hundred cases at Summerdown and the adjacent Officers' Convalescent Hospital, and met with success also at many other centres.—I am, etc.,

J. S. KELLETT SMITH,
Cheltenham, Nov 18. F.R.C.S., D.M.R.E.

Treatment of Varicose Ulcers

SIR,—There being a considerable vogue for the treatment of varicose ulcers by occlusive dressings, the following experience of mine (albeit that of a humble general practitioner) may be of interest in seeming to indicate that this method may have its disadvantages (in any case the damming up of foul stinking discharges seems to me to be unhygienic and repulsive).

The patient, a woman of 50 and weighing close on 15 stone, came under my care suffering from multiple varicose ulcers on both legs, which had been treated with strips of elastic adhesive bandage, each strip being just sufficient to cover the ulcer. She also told me that before using the strips her doctor had treated her by elastic adhesive bandages applied to the whole of the leg but without any improvement. When I saw her she was in bed and the ulcers were still covered with the occlusive strips. Both legs were reddened and oedematous and excessively tender. In the calf of the left leg was a fluctuating swelling from which a considerable quantity of pus was later evacuated. In addition she had a number of boils, one excessively large and painful being in the left axilla and another in the right groin. Her temperature was 101.5° F. No glycosuria. On removing the occlusive strips several ulcers were disclosed which showed no signs of healing but which exuded considerable quantities of foul-smelling pus. The ulcers were irrigated daily with "sanitas" fluid diluted 1 in 6 (later increased to 1 in 4) with alternate irrigations of warm hypertonic saline. The boils were treated by incision followed by fomentations with cataplasma kaolin. By the second day of treatment the temperature had fallen to normal and the redness and oedema of the legs had largely disappeared. In three more days the floors of the ulcers were covered with healthy granulations and thereafter healing was rapid. The abscess in the calf of the left leg, however, caused some trouble, necessitating incision under an anaesthetic and drainage, followed by packs of 1 in 1,000 flavine in normal saline. The considerable quantity of pus contained in the abscess yielded in culture an almost pure growth of *Staph. aureus*. The patient was thereupon given uleron—two tablets t.d.s. for five days—and the condition promptly cleared up, and she made a good recovery with complete healing of the leg ulcers.

The above experience seems to show that in treatment of varicose ulcers (especially if multiple) by occlusive dressings there is a definite risk of systemic infection and abscess formation from the damming up of septic discharges.—I am, etc.,

Leamington Spa, Nov. 6. J. R. A. DAVIES.

Use of Radium in War Time

Sir,—I have read with much interest the article on "The Use of Radium in War Time" in your issue of November 11. The authors certainly go far to show the ultimate grave danger to life from the retention in the system of exceedingly minute quantities of radium. In support of their views they give a considerable number of references. On analysis one finds that these refer to workers who have been employed for years in occupations in which they habitually used radium, particularly those who licked brushes in order to point them in the painting of luminous dials, etc., or to injections direct into the circulation. The excretion of radium is also considered and is apparently rapid, though not complete, as a certain degree of radio-activity persists.

The facts as stated are not in dispute, but exception must be taken to the assumption that the conditions of the cited clinical and experimental work are in any way comparable to those that would be produced if a bomb made a direct hit in which radium was involved. In these conditions those who were immediately around the radium would suffer the same dispersal as the radium. For the survivors, if any, it would be a case of one and only one dusting; a very different risk to the daily exposure of occupation or the actual injection of radium into the blood stream.

In the quoted literature there is an instance of a physicist being powdered by the explosion of some radium, but there is no record that he suffered ill effects from this extremely severe dusting.* Probably nobody was so exposed to the radium risk as Madame Curie in her primitive draughty workshop with its leaky roof and smoky stove, yet she lived for thirty-six years after the discovery.

Are there no records of people showing changes in the bones or dying from aplastic anaemia, other than those employed in radium work, to support the view that radium scattered into the air by direct hit would be such a frightful menace to all around? Can no records be produced of the deaths of surgeons who have inadvertently damaged or broken needles in the course of their work? Are there no instances of deaths among those who have searched the ashes of incinerators or who have dug the city refuse heaps to recover lost and often much-damaged needles? To the best of my knowledge no such records exist. The assumption, therefore, that the references quoted have any direct bearing on the problem of the use of radium in war time seems to me to be unjustified by experience.

Nobody would doubt that the hiding away of large quantities of radium, especially in soluble form, is expedient if only because of its intrinsic value; but for relatively small quantities that might be dispersed into the air from a direct hit on needles or plaques the danger to life seems more hypothetical than real, especially if we allow for the fact that the lungs are capable of eliminating practically the whole of the inhaled dust within a relatively short time. The chances of the retention of a particle of radium dust from one dusting must be exceedingly remote.

I asked an authority on shells what were the chances of a direct hit on a source of radium if a given area was being bombed from the air. He ventured a figure in the neighbourhood of 1 in 5 million. Suppose that, with this remote chance of a direct hit in mind, a number of needles were actually disintegrated, again bearing in mind the improbability of the destruction of such light yet strong little tubes as radium needles. What would be the dilution of the radium in the dust at a distance compatible with the survival of any who happened to breathe it? How much of this contaminated atmosphere would they breathe before they fled out of it or before the dust settled? If this series of probabilities was expressed in figures the danger to life would be so infinitesimal that it would not be worthy of a moment's consideration as a war risk.

The conception that the contaminated site would become untenable for all time seems to me to be unjustifiable; doubtless this would be so as regards delicate scientific apparatus, but as a risk to human life it is quite a different matter. In mining for radium there appears to be a definite risk to workers that ultimately leads to a percentage of deaths from pulmonary disease, but a contaminated area from a bomb explosion would contain so little radium that it would not be worth disturbing by mining. Moreover, a "clucking hen" (Müller Geiger counter) would quickly determine the presence of any concentration that was worth attention. If grass was grown over the contaminated area it would prevent the possibility of dust.

The danger of *irradiation* from radium diffused over a wide area is one that could easily be assessed by measurement. We know that radiations are subject to the inverse square law, and surely the danger from this source must be fantastically remote. I am told that under a housing estate there is a quantity of radium in the dump on which it is built, and in one of the western cities of the U.S.A. there is a concrete pavement in which a relatively large quantity of radium lies buried. No known ill effects have occurred from these sources of potential danger.

While accepting that radium, if it becomes fixed in the system even in minute quantities, may be a source of danger to life, it seems to me that the risks from war conditions in this respect are not based on foundations that justify the precautions (and consequent disuse of radium) that have been in force since the outbreak of war.—I am, etc.,

Oxford, Nov. 17. A. E. B.

* Since writing the above I have learned that this man, constantly employed in radium work, died about five to six years later.—A. E. B.

Prophylaxis of Influenza and Cancer

Sir,—The value of any of the multiplicity of remedies recommended for the prophylaxis of influenza and colds could be judged better if administered well before the expected peaks of outbreaks and epidemics, as some weeks are needed before any rise of immunity can be produced by prophylactic agents.

Owing to one group of my cancer patients showing the first signs of primary or recurrent malignant disease a few weeks after influenzal attacks I have recently made a new study of the series of influenzal epidemics and outbreaks since 1890, and have suggested that a two-phase modification of Brownlee's theory can account for all the phenomena of influenzal waves.[1] In recent years the peaks of the waves have been in February, June, and October (though they may show before long a backward drift, as has been traced in the years just after the last war). As the peaks are usually preceded by some weeks of rising death rates, practitioners who intend to try any of the remedies advocated should begin their tests soon, before the expected January rise starts.

There is on the market now at least one influenzal virus vaccine, combined with catarrhal vaccines (Parke, Davis and Co.), and results with this and similar virus brands will be of great interest. Also Shope's studies of swine influenza in the United States[2] showed that considerable protection was given by heat-killed vaccines of the bacilli which had been found associated with the virus; so some immunity might be expected to result in patients from some of the brands of catarrhal vaccines *when administered at the most effective time*. The latter proviso has been lacking in a number of the tests made with bacterial vaccines.

In addition to virus and catarrhal vaccines other remedies may be given with the aim of raising immunity; one of the best attested of these so far is serocalcin, which has been under clinical trial for six years.[3] A month's trial of this remedy is said to give a four-months immunity to influenza and "colds." Certain vitamin products and ultra-violet ray treatments also are among those which have a probable immunizing value.

The similarity in the periodicities of influenza and cancer which I have traced[4] is of the greatest interest to theory and practice: it supports the virus theory of cancer; and in the attempts to prevent cancer recurrences, in addition to radiotherapy given beforehand to sites likely to show recurrences, the effects of influenzal virus and bacterial vaccines, and other possibly immunizing measures, are being tested.

[1] *Edinb. med. J.*, 1939, **46**, 591.
[2] *J. exp. Med.*, 1937, **66**, 169.
[3] G. Tippett and MacLeod Yearsley, *Med. Pr.*, 1939, **202**, 254.
[4] *Brit. J. Surg.*, 1938, **26**, 113.

The relation between influenza and cancer has been found lately not to be confined to the clinical group already mentioned, in which recurrences (or a primary) followed a few weeks after influenzal attacks, but my analysis of the dates of recurrences in any given year has shown that a great proportion of these have run concurrently with, or a few weeks after, the influenzal "periods," as detailed in the paper on influenzal periodicity.[1] This is a very interesting and unexpected finding, suggesting that the relation between the influenzal and the neoplastic viruses may be quite a close one. It suggests that efficient prophylactic measures for cancer, as for influenza, may be not long delayed.—I am, etc.,

London, W.1, Nov. 18. J. H. DOUGLAS WEBSTER.

Cancer and Pernicious Anaemia

SIR,—I endeavoured in a letter to the *Journal* of June 16, 1934, to expound a theory of cancer based on the supposition that it is a deficiency disease.

Since 1934 no real evidence has come to light that cancer is due to virus infection. Much time and money have been spent on this line of investigation. To my mind a drive should be made along new lines, and I would like one new line to be that cancer is caused by a deficiency in the body of the person attacked by this disease, and that in all probability the deficiency is of a substance that is essential to the normal formation of a certain type of cell. Also that this substance, "*x*," may become "fixed" from time to time in single cells, and that if and when this substance is used up by that cell and there is no further supply forthcoming, that cell will die. In order to prevent its death this cell starts reproducing.

By way of support for my theory I would suggest that pernicious anaemia is a form of cancer. If pernicious anaemia is a cancer then we are well on the way to discover a substance that will control each and every individual type of cancer severally. We can control pernicious anaemia, therefore we can control one type of cancer. All I can do now is to try to point out why I think that pernicious anaemia is a cancer. No doubt many will scoff at this suggestion, but before they do let them think of the cases of pernicious anaemia that died before liver treatment began and the clinical picture these cases used to present.

Now for the comparison between cancer generally, on the one hand, and cancer of the marrow, or, as we know it now, pernicious anaemia, on the other.

Cancer	*Pernicious Anaemia*
1. Hereditary tendency.	Both hereditary and familial tendency.
2. Cancer is a disease of the middle-aged or elderly, affecting the sexes about equally. It is sometimes met with in young adults and rarely in children.	Pernicious anaemia is a disease of late adult life and affects the sexes about equally, rather commoner in men than in women. It is sometimes met with in young adults and even rarely in children (Muir). Only 9 per cent. under age of 40.
3. Progressive and leads to fatal termination with remissions without any form of treatment.	Progressive and fatal with remissions without any form of treatment.
4. Prognosis very bad. Death ranging from six weeks from onset to over two years without treatment.	Prognosis very bad without treatment. Osler's opinion is that average life with remissions is one year.
5. Histologically the cells of cancer are directed to proliferation.	The cells of the marrow are directed to proliferation, although the blood picture has tended to mask this from our eyes in that the blood cells actually decrease in number.

Up to the present time the average worker on pernicious anaemia has concentrated on the blood picture as arrived at by blood count. The fact that there is diminution in the number of cells circulating in the blood tends to hide the fact that this is not really the true state of affairs as to the actual number of red cells, normal and abnormal, in the body as a whole. Now in the bone marrow there are important changes. The fatty marrow in the long bones and in the short bones is now all marrow of a dark red colour (this, of course, towards the termination of the disease). According to most writers on this subject this marrow contains not only gigantoblasts but megaloblasts and large numbers of erythroblasts. The whole change may be regarded as a marrow hyperplasia of megaloblastic type.

It has been said that this is a degeneration of cells, but I feel that this is really in the nature of an embryonic regeneration of cancer cells. These cells are imperfectly formed because they are lacking in the substance "*x*" and are undergoing rapid proliferation in search of it. They are easily destroyed on reaching the blood stream owing to their unstable form, and so we find the picture of anaemia and the deposits of iron in the various organs.

Considerable hyperplasia of marrow takes place in the confines of the bones, and the picture post mortem could quite easily be interpreted as a cancer of marrow.—I am, etc.,

Christchurch, Hants, Nov. 12. EDWARD F. HUNT.

Treatment of War Wounds

SIR,—The publication of Professor Trueta's admirable book has aroused wide interest and much criticism. The book, while emphasizing the necessity for well-recognized principles of rest to the bone and soft parts, opens a further line of thought. A point which struck me was Dr. Trueta's insistence on the use of dry gauze instead of vaseline pack, as in Winnett-Orr's method. Perhaps the importance of this minor detail can explain the better and more astounding results obtained. Vaseline by its viscid nature prevents the absorption of calcium from the plaster to the wound. Dr. Trueta quotes Kline, and has emphasized that the vicinity of the plaster should supply enough calcium. A condition of local excess of calcium is thus produced which has three effects: (1) it encourages the union of fracture; (2) it helps in the production of non-pyogenic bacteria which antagonize the pyogenic; and (3) it has a general wholesome effect.

As long ago as the last war (1914–18) Baer observed the beneficial effect of maggot therapy, which Stewart believed to be due to exudation by the maggots of calcium carbonate, and he recommended dressing wounds with this.—I am, etc.,

London, W.2, Nov. 12. B. B. BHATIA.

Vein-seeking

SIR,—I have read with interest Mr. F. Ronald Edwards's description of his "vein-seeker" in the *Journal* of November 11 (p. 957). Exactly the same effect can be obtained by the following method, which has the advantage that no special instruments at all are needed.

The needle, fitted to a sight-glass, is connected by rubber tubing to a drip-bulb and the whole filled with saline or citrate. The tubing is then closed by a screw clip about two inches away from the sight-glass, and the drip-bulb is connected to the bottle of blood. The rubber tubing between sight-glass and screw clip is then compressed in the same way as the rubber teat on Mr. Edwards's vein-seeker. The needle is inserted under the skin, the pressure on the tubing is released, and blood will be seen to enter the sight-glass as soon as the vein is entered.

If a second bottle of blood is needed the drip-bulb can easily be changed over to a new bottle. Intravenous anaesthetics or stimulants can be injected into the rubber connexion between sight-glass and drip-bulb.—I am, etc.,

GERHARD BEHR,
Medical Officer at St. Bartholomew's Hospital, Rochester.

Nov. 12.

Complement Preservation.—The addition of sodium chloride and boric acid to guinea-pig serum preserves its complement activity for as long as six months.—Studies on the Preservation of Active Constituents in Serum, with Special Reference to Complement: A Contribution to the Theory and Practice of the Complement-fixation Reaction. A. Germershausen.—*Z. ImmunForsch.*, June 1939, **96**, 1.

Medico-Legal

MEDICAL MAN CHARGED WITH WIFE-MURDER

Defence of "Dissociated Personality"

Verdict: "Guilty but Insane"

At Nottingham Assizes on November 16, 17, and 18, before Mr. Justice Singleton, Dr. Leonard Phipps Lockhart, of Beeston, aged 41, medical officer to a large industrial undertaking, was charged with the murder of his wife, Mary F. L. Lockhart, at their home on September 2. Dr. Lockhart was found guilty but insane, and was ordered to be detained during the King's pleasure.

Mr. P. E. Sandlands, K.C., and Mr. T. R. F. Butler appeared for the prosecution, and Serjeant A. M. Sullivan, K.C., and Mr. T. N. Winning for the defence.

The Facts of the Case

For the prosecution it was stated that on September 1, the day of the invasion of Poland, Dr. Lockhart and his wife, who were a devoted couple, were noticeably apprehensive about the war, the wife especially. That evening, to a friend who complained that his wireless set did not give good reception, Dr. Lockhart said, "You can have mine," and gave it to him. Next morning a manservant employed by Dr. Lockhart, on arriving at the house, was warned of gas, and found the doctor and his wife in the study lying near a gas fire. Mrs. Lockhart was dead and the doctor unconscious, but he recovered in hospital. An envelope was found giving directions to the servant about notifying the solicitor and other matters. On Mrs. Lockhart's arm was a puncture and in the bedroom a hypodermic syringe which had contained sodium evipan. A post-mortem examination of the woman's body showed that there was evipan in the liver. The necropsy also showed that death was due to carbon monoxide poisoning. There was no evidence of struggle or violence.

Evidence was given by Dr. A. Somerville of Beeston, who said that after the manservant's discovery he was summoned to the house and found that Mrs. Lockhart had then been dead for six or eight hours. Dr. Lockhart could not have been under the influence of the gas for very long, or he too would have died. In reply to a question, he said that he doubted very much whether a hypodermic injection could have been made other than with the consent or at least the knowledge of the woman. Dr. J. H. Donovan of Nottingham General Hospital said that on admission Dr. Lockhart was found to be suffering from carbon monoxide poisoning. On recovering consciousness he asked when his wife was coming to see him and was greatly distressed when later he was told that she was dead. He said that the last thing that he remembered was giving his wireless set to a neighbour. This witness in reply to a question said that he thought a healthy person might succumb to carbon monoxide from a gas fire in half an hour.

Case for the Defence

Serjeant Sullivan, in opening the case for the defence, said that it was for the prosecution to establish that the accused was guilty of murdering his wife, and, if so, that it was a conscious act. Mrs. Lockhart died as a result of carbon monoxide poisoning, but the case was confused by the fact that she had previously, with her own consent, received an injection of evipan at some time long enough before her death for it to circulate through the system and reach the liver. She did not die from the effects of the evipan, nor did the injection in any way accelerate her death.

There was evidence that both husband and wife went to bed on the night of September 1, but after that they did not act together, because the most significant factor in favour of the accused was that when Mrs. Lockhart was found she had been dead for some hours, whereas Dr. Lockhart was still living, although in a state of deep unconsciousness. This might be an attempted suicide by Dr. Lockhart, but there was no evidence of agreement to die together. It seemed probable that, Mrs. Lockhart's death having taken place about 1 a.m., Dr. Lockhart awoke at 7 a.m., and, finding his wife missing, went into the study, found her lying dead, and possibly tried to revive her and, failing to do so, attempted suicide.

If the accused was responsible for the death of his wife there arose for consideration in this case a mental or psychological phenomenon which presented difficulties of the most unusual kind. It was not a defence of insanity that he proposed to make; it was a defence of unconscious action, not arising from insanity at all. Some of the most eminent medical men in the field of psychiatry would be called to support this defence. The work of the accused necessarily brought him in contact with leading members of his own profession, and the expert evidence to be called would be given by those who knew him before this event occurred. Counsel went on to develop the argument for the existence of a condition in which the personality for a period long or short no longer controlled bodily actions—in which the automatic powers of the body were left in charge without any exercise of the personality. The appalling suffering and strain of the last war brought this condition of dissociation into prominence, but it was far more common than many people appreciated because it was only in a small proportion of cases of dissociated personality that any act of a startling or criminal nature was performed. In the great majority of cases of "fugue" the mechanical operation of the subordinated portion of the brain sufficed not only to keep the man alive but to carry him through operations even of an intricate kind with apparent intelligence and purpose and with nothing to suggest inadequate control.

The defendant's story began in August, 1918, when, while serving in the army, he suffered concussion from a bursting shell. While he was being lifted into an ambulance a blank came, and when next he remembered anything he was back in the tent where his company had been the night before the attack, and of what occurred between those two incidents he had no notion. A little later, still serving in the war, he had a similar experience, and afterwards, having taken up an appointment at the Royal Devon and Exeter Hospital, he again had a blank period, as a consequence of which he left and took up other work. When therefore his memory ceased to function on the night of September 1 it was an index, from previous experience, to a dissociation of personality. It was not the carbon monoxide poisoning which caused the lapse of memory; the lapse had already occurred. The defence therefore urged that a man whose mind was dissociated from his personality was not responsible for acts which he might perform mechanically; he was not insane, but unconscious, and even if it were found that he had terminated the life of his wife the verdict should be "Not guilty."

Dr. Lockhart's Evidence

Dr. Lockhart, in the witness box, described his experience in the great offensive of August, 1918, when his platoon, with the exception of himself and another, was wiped out. The last thing he remembered was being put on a stretcher and carried by German prisoners, and when he came to himself again he was in the assembly tent, with no recollection of how he had got there. On another occasion, while inspecting positions with his commanding officer, both of them got stuck in the mud, and again there occurred a total blank in his memory. In 1924 he was appointed resident medical officer at the Royal Devon and Exeter Hospital, and as part of his duties he had to administer anaesthetics. He had never given volatile anaesthetics by himself before, and he found his right hand trembling, and after that he could remember nothing else. On the advice of the senior physician of that hospital he decided to leave and go in for research work, not into active clinical practice; he was for a time at St. Thomas's Hospital and then became Delépine Research Fellow in Preventive Medicine and Bacteriology at the University of Manchester. Later he entered the employment of Boots Pure Drug Company to carry on bacteriological research and to look after the welfare of the staff, but the welfare work soon assumed prominence and he was responsible for a staff of about 22,000. His work was not domiciliary, but he co-operated with the workpeople's own practitioners. He was a member of a number of organizations connected with industrial medicine, and was also in charge of the medical side of the local A.R.P. He put his heart into his A.R.P. work, but was doubtful of his own adequacy.

After saying, in reply to a question, that his marriage was a perfectly happy one, Dr. Lockhart was questioned as to certain dispositions he had made in a letter to his manservant dated September 1. He said that both he and his wife had been concerned for the future welfare of this servant in the

disintegration of social life which they feared might follow if war came. Explaining a phrase in a letter to the servant, "If anything should happen to us both . . .", Dr. Lockhart said that he was the only resident doctor in the part where he lived, and he and his wife, who was a V.A.D. nurse during the last war, intended to work together in the area, which was a vulnerable one. The manservant had served them very well, and they wished to make provision for him. On the same day that he wrote the letter to the manservant he posted an application for Membership of the Royal College of Physicians, his application being under the by-law which excused examination by putting in published work, and he wrote to his sponsors, Lord Dawson and Sir Arthur Hall, informing them that he had done so.

Dr. Lockhart then described the events of the fatal evening. It was not true that he made a gift to his neighbour of his wireless set. He lent it to him for the night. As he entered his house that evening he heard his wife call to him, but he remembered nothing more until he woke up in hospital puzzled by what turned out to be a blacked-out bedside lamp. He had no idea at all that he was connected with his wife's death. He was visited in prison by Dr. F. H. Brisby, medical officer of Leeds prison. There happened to be a faulty gas fire in the room where the interview took place, and some smell of gas. Dr. Brisby asked him whether he remembered on the night in question turning on the gas, and he replied that he did not, but after Dr. Brisby had left, thinking over his visit and the connexion between his remark and the smell of gas, he became disturbed, and an image began to arise in his mind of his wife's body, which was very cold and limp in his arms, and of a strong smell of gas. The images bore no relation in time or sequence to one another, but he also had the impression of the body lying somewhere in the attitude adopted by a patient who was being given an intravenous injection. This recovery of memory was associated with a feeling of terror that mutilation should have come to his wife as a result of war. He had an attack of convulsive sobbing, and Dr. Brisby was again sent for. He added that he had never at any time contemplated suicide, nor had his wife.

In cross-examination he was questioned as to the hospital incident in 1924, and he explained that although he felt he could not give volatile anaesthetics, it was not due to a shrinking from responsibility so much as to a great anxiety for the unconscious patient. It was suggested to him that the various documents he had left for the manservant betokened an extravagant precaution, but he said that they were prepared in view of war emergency, not with the purpose suggested by the prosecution, and that he was by habit of mind extremely cautious. He was responsible, for example, for a quarter of a million units of tetanus serum, and his precautions had to be extreme. Asked whether he remembered a tourniquet on his wife's arm, he said that he did not, but he recollected the hand being in the position which indicated that the tourniquet was there. A notice, "Keep out; gas (study). Fetch police," which was found by the manservant on arriving in the morning was not within his recollection; he could not recall either writing it or placing it in the hall. A previous witness, an air raid warden, had stated that Dr. Lockhart had visited his post twice on the night of September 1 to complain about lights; Dr. Lockhart said that he could remember only the earlier visit. With regard to the syringes, forceps, and other apparatus which were found, some of them on a stool in the bedroom, he said that these were part of the kit which he and Mrs. Lockhart had got together for an A.R.P. emergency bag.

Nurses' Evidence

Miss Matthews, nursing sister at the Royal Devon and Exeter Hospital, testified that she was at that hospital in 1924 when Dr. Lockhart was there, and she remembered that he told her he had a great dislike of giving anaesthetics. She heard that he was supposed to have had a mental collapse, and she did not see him afterwards. Miss Ellen Rabett, theatre sister at the same hospital, said that Dr. Lockhart gave anaesthetics on several occasions. One afternoon when he was doing so he complained of not feeling well and looked rather distraught. He agreed to her suggestion that he should go to his room. He had said on other occasions that he was not very certain of himself, and did not like the confinement of the theatre. On the day in question he was very much perturbed and did not seem to understand what he was doing. He had muddled the bottles in which the anaesthetics were kept.

Medical Evidence for the Defence

Dr. Millais Culpin, professor of medical industrial psychology in the University of London, said that he had known Dr. Lockhart for six or seven years. His opinion as to his responsibility for his acts on the night of September 1 was based on the assumption that he was speaking the truth as to his loss of memory.

"This is a condition with which I have previously been very familiar in the war in patients suffering from mental disturbance. They have been under great emotional stress, which they have resisted, and have reached a point at which the emotions overcame them and the ordinary stream of consciousness was suspended. In that condition they performed acts which were quite foreign to their ordinary personality, and when this period ceased they have had no recollection of it. That observation is based upon the fact that I use a particular technique which enables me to restore the memory for the period when their ordinary consciousness was suspended."

Asked whether the partial recovery of the memory as spoken of by Dr. Lockhart was confirmatory or contradictory of the witness's opinion, Professor Culpin said that his description fitted in precisely with what happened when memory was restored—the rush of emotions and ideas which had been shut aside hitherto now took possession of his consciousness. The period of suspended consciousness might in his experience last for hours or weeks, or even in a few cases for years.

What is it that carries him off?—Some urge which he had not previously allowed to take possession of his consciousness—some urge or set of emotions which he has hitherto excluded or tried to exclude.

Is the existence of such a condition rare or common?—It is more common than people think, even in civil life.

Much more frequent, you think, since the last war?—I have no means of comparison.

Have you seen a number of cases which you think are attributable to the war?—Yes, and some independently of the war.

Can such a condition come on gradually?—There may be premonitory warnings, but the victim would not appreciate or understand them as a rule, though his actions would indicate the approach of such an attack.

The witness said that he judged from what he had heard that the accused had a pretty bad shell shock, but the unusual feature about it was that he returned to his duty, whereas most men ran away. His attitude towards the administration of anaesthetics threw some light on the subject. With regard to the letter addressed to the manservant on September 1, if he had seen that letter, knowing the accused, he would have felt alarm, he would have felt that something was going to happen, but he would not have read into it the conscious intention to commit suicide. Asked by the judge whether he regarded the writing of the letter as showing that Dr. Lockhart was not in his normal state through strain or illness, he said that he did; it was the letter of a man who had no clear idea what was in front of him. The fact that on the same day as the letter to the manservant he had applied for the M.R.C.P. substantiated his opinion; the application was the act of an ordinary healthy man looking forward to the future. Professor Culpin was asked whether in the condition he had described the man would be capable of forming an intention to kill his wife, and replied that he would find himself doing it without thinking about it.

Would he be capable of forming a judgment as to the propriety of his action?—He would not think of it.

The judge said that the question was not answered, and after a pause the witness said that it was difficult to answer, but he could picture something taking place almost automatically, the bodily action being controlled by the set of emotions and ideas which had taken possession of his consciousness.

In cross-examination the witness was pressed as to what proof there was that a man who said he could not remember events was speaking the truth. He said that he had been doing this work for years, and it was his business to know whether the emotional reactions were genuine or not. If they were genuine, it was a proof to him that the forgetting was also genuine. Asked to explain a phrase he had used, "the reason was in abeyance," he said that it was another way of expressing the fact that other emotions and ideas had taken possession of the consciousness to the exclusion of reason. There were many forms of this separation of consciousness, of which somnambulism was one.

The judge asked about the significance of the note which was left in the hall, giving warning of gas.

If it be written by one who had anything to do with the turning on of the gas it shows a complete association of ideas?—It shows that that part of him did realize that something had happened.

There was something which was dangerous, so that if he is prepared to be responsible for it he is seeking to warn others of the danger?—Yes.

It is not quite a dissociation of ideas; it points to a desire to protect other people coming to the house?—I agree, and I could not account for it. It does point to a stage in which he realized something.

Some memory?—Yes, of the outside world.

The witness said that it was well known that Dr. Lockhart was a man of great scruple, and it was possible that at this stage the good part of him took possession once more. The judge also asked whether, on discovering his wife dead in such circumstances, the natural thing would be to run for help. The witness replied "No," and recounted his first interview with the accused, when he asked him what were the worst things he remembered in the war, and he replied, "Boys on barbed wire having their guts shot out." At the second interview he spoke of the stress of the "bloody A.R.P.," imagining countless situations and problems. In the recovery of memory there came a sense of terror lest mutilation should happen to his wife, and the night following recovery he had dreams of his wife and of war and mutilation. He judged that the accused's mind was occupied with a terrible fear, and it was under that fear that he did what he did.

Dr. R. D. Gillespie, physician for psychological medicine at Guy's Hospital, said that he saw Dr. Lockhart in Lincoln prison three weeks previously. If the evidence given in court as to loss of memory and the incidents in the Army and at Exeter were accepted, he would conclude that on the night of the tragedy the accused was in a dissociated state, by which he meant that there was a break in the continuity of his consciousness. While people were in that condition they were capable of purposeful acts of an elaborate nature. In most cases the persons affected went through life without doing anything abnormal, judged by ordinary standards. On the evidence given he considered that the accused was a person susceptible to this peculiar mental state. Asked whether there was anything in the nature of mind disease involved, he said that it was a type of mental disorder; memory and judgment were for the time being seriously impaired or in abeyance, though some kind of will prevailed, otherwise no action could be carried out. The warning note against gas was a difficulty, but probably there was not always a complete break in continuity between the normal and abnormal states: the note might have been written during an interval of consciousness, and the subsequent forgetfulness was not against that hypothesis.

Dr. J. R. Rees, director of the Tavistock Clinic, and at present consultant for psychological medicine to the Army, had known the accused for some years as an eminent man in his own branch of medicine. He had always thought him to be a tense and highly strung person, inclined to be carried away by ideas. He accepted what the accused said as to his loss of memory, and he formed the opinion that at the time of the tragedy he was in a mentally dissociated state. Personality in such a condition might be completely or partially altered. Criminal characteristics appeared in only a small percentage of cases. On cross-examination Dr. Rees said that before loss of memory there must have been a period of strain and tension, and to Mr. Sandlands's suggestion that strain and tension were common to many people at that time Dr. Rees retorted that breakdown was common too; he himself had had two cases in one day.

Apart from that common strain, the only thing that really affects you is that the acts complained of were inconsistent with the normal character of the accused?—Yes, I agree.

Lord Dawson's Evidence

Viscount Dawson of Penn testified that he had known the accused personally for two or three years, and for a longer time by reputation, and had had an opportunity of forming an opinion as to his character and capacity. Dr. Lockhart had served on the Medical Committee of the National Fitness Council. He was a man highly intelligent and full of enthusiasm, speaking sometimes almost with a religious fervour and having to be called back to deal with the details of the moment. Lord Dawson had formed his opinion on the case from the history as given in the witness-box and from a visit to the accused in Lincoln prison. Every physician knew how difficult it was to evaluate what a person had to say about himself, and doctors acquired considerable skill in judging the accuracy of such statements. He had taken a good deal of trouble to find out how far Dr. Lockhart's memory was affected, and he came to the conclusion that his memory of the essential parts of this tragic incident was lacking. With regard to the letter to the manservant, considering Dr. Lockhart's morbidly over-anxious temperament, which moved quickly from anxiety to terror, and from terror to imbalance, he was not convinced that he remembered that letter very well. He judged him to be suffering from dissociation between the higher and the lower levels of the brain. The accused conformed to a type well known to those who had made a study of automatic states. The patients were mostly people who performed foolish, sometimes insane, acts; it was only a minority who were guilty of anti-social conduct. Asked what he meant by an automatic act, Lord Dawson replied that he meant an act which was purposive, executive, and at times extraordinarily elaborate, but which took place without the person knowing what he was doing, and the memory of which, in most instances, did not persist. He would class the present among such cases, always remembering that it had a criminal implication. Asked whether Dr. Lockhart would realize the nature and quality of his action, Lord Dawson said that the higher levels of the brain were concerned with the greater part of the "knowingness," and without that "knowingness" he would not be able to evaluate what he was doing, nor would he have the power of choice, nor a proper control over his conduct, nor the means of knowing what his conduct should be.

In cross-examination Lord Dawson said that the executive side of the mind might remain intact while the "knowing" side might be suspended. Questioned as to the warning notice, he said that it might indicate a partial appreciation of what he was doing. In his judgment this lapse or abeyance of "knowingness" did not maintain a steady level; it would return and recede. The judge pointed out that the preparations for the anaesthetic must have been fairly considerable. Surely a man could not carry out all these details without knowing what he was doing? Lord Dawson admitted that the action was complicated, but such things had been known before. Dr. Lockhart had taken up evipan because he wished to avoid volatile anaesthetics, and had become adept in its use in his research work. The judge said that the prosecution had put forward the theory of a suicide pact. Would this mean that both parties were in a state of "unknowingness"? Lord Dawson replied that it was impossible to answer for the wife.

Evidence of Prison Medical Officers

Dr. F. H. Brisby, medical officer of Leeds prison, who was called by the prosecution at the request of the defence, said that he was asked to supplement the observations of the prison medical officer at Lincoln. He visited the accused on November 10 and 11. At the first interview the accused told him that he had completely lost his memory regarding the events on the evening of September 1 after he returned home and heard his wife calling him. At the second interview he told him that he had had in the interval what might be described as an emotional storm. From a remark which he (Dr. Brisby) had made, linked up with a smell of gas from a faulty stove in the room, he said that some memory had returned to him. His mind was in a complete turmoil, with terror predominating, and this terror was largely centred on the wife. Asked whether he noticed a change of demeanour between the first and second interviews Dr. Brisby said that the first time he saw Dr. Lockhart there was a distinct air of detachment about him and he discussed the case impersonally. On the next day there was a great change. As a result of the two interviews he formed the opinion that the accused was of an unstable type, and with acute apprehension and mental stress acting on his unstable mentality his mind on the night of September 1 became unhinged so that he would not know whether his acts were right or wrong. The judge asked the witness's view of the kind of loss of memory which had taken place, and he replied that he thought that an impression of a very painful nature had been received; something absolutely incompatible had happened, and he had simply blotted it out, not allowing it to enter his conscious field. This could only arise through the man's disordered state.

In cross-examination he agreed that states of dissociation were not uncommon, although anti-social acts in such states were rare. The normal dissociate behaved more or less like a normal man of low intelligence. In a state of dissociation a man might appear to be absolutely normal in his different personality or he might be an abnormal person and commit a crime. There were many degrees of dissociation, and it might be mass or transient.

Dr. F. E. Norris, medical officer of Lincoln prison, said that he had had Dr. Lockhart under his close observation since September 5. He agreed generally with Dr. Brisby's conclusions. The mechanism of dissociation was a matter of theory, and he did not agree entirely with the picture of dissociation drawn in this case. The impression had been given that the higher orders of the mind had been cut off from the lower, but his idea of what happened was that dissociation was not so much between the different levels of the mind as between the conception of the mind at all his levels and the associated ideas. He thought there was a narrowing of consciousness rather than a cutting off of the higher consciousness. He agreed that the present was a typical case of its kind, that the emotional storm was genuine, and that the accused would not be able to exercise judgment as to right and wrong.

Counsel's Closing Speeches

Serjeant Sullivan, in his closing speech for the accused, said that although this case had presented an interesting problem to the medical world, there was no proof that this man had anything to do with the termination of the life of his wife. It was only on that assumption that the medical evidence became important. Insanity meant that a man had a perverted memory and judgment, and that, instead of appreciating the true nature and quality of his acts, he might conclude that an act which was utterly wrong by all proper standards was an act of virtue. The defence in this case was that the personality of the accused was not operating at all during the period in question; there was no vicious operation of memory, judgment, or will; these were suspended for the time being. There was a difference between having a mental judgment which operated in a wrong way and having no capacity for judgment at all; the one was insanity, and the other was unconsciousness of what was done. The same words and phrases had to be used to explain many gradations and differences in mental states. Assuming that the accused was found to have caused the death of his wife while in an unconscious state, he had now recovered his personality, and counsel suggested that the true view upon the medical testimony was that it was not his personality which had been acting at all, but an unconscious—or, to use Lord Dawson's word, an unknowing—series of actions, elaborate, purposeful, and apparently rational in the sense of being thought out. If that view were taken the verdict should be simply "Not guilty."

Mr. Sandlands, for the prosecution, said that facts had been brought forward from which no other inference could be drawn than that this unfortunate man was responsible for the death of his wife by administering an anaesthetic so that she should not know the terror of approaching death, and then turning on the gas fire and arranging a canopy over her head so that the gas should be inhaled. The preparation of the documents which were left for the manservant showed that the accused was fully conscious of what was being done. The court had been asked to believe that the letter to the manservant stating that, among other things, he could live in Dr. Lockhart's house had no connexion with the events of the fatal night, but surely it meant that some happening was contemplated which would leave the house intact although it might destroy the lives of Dr. and Mrs. Lockhart. Why was it that the documents were taken from the bag and put in the hall where the manservant could find them? Was this consistent with the idea of the suicide of Mrs. Lockhart and the horror-stricken husband finding her in the morning? From the evidence of the three psychologists it was clear that they thought the accused to be suffering from a disorder which made his reasoning powers so defective that he was incapable of appreciating the nature and quality of his act or, if he did appreciate it, that he was unaware that he was doing wrong. The two prison medical officers had said that dissociation was due to a mental disease, that he must have known what he was doing, but the control was by a diseased mind; it was not a case of absence of control but of wrong control, and he asked the jury to take the merciful view that at the time these acts were committed the unfortunate man did them because of defective reason due to disease of the mind.

The Summing-up

Mr. Justice Singleton began his summing-up, which occupied two and a half hours, by complimenting the prosecution and the defence on the fairness with which the case had been conducted. He also commented on the fact that although many distinguished physicians had been to see the accused man, yet it was the prison medical officer who by a chance remark was able to restore certain portions of his memory, and the judge added that those in the criminal courts knew how concerned prison medical officers were for the welfare of those who came into their hands.

The prosecution's point was that the facts suggested an agreement to commit suicide. He explained the law on suicide pacts whereby a survivor was held to be guilty of murder. Assuming the jury was satisfied that Mrs. Lockhart died at the hands of the accused man or as the result of a suicide pact, Serjeant Sullivan had still contended that the verdict should be "Not guilty," and had put forward the defence of unconscious action. He had spoken of the accused man as being an automaton, and the jury must ask themselves how far these ideas carried them in a case of this kind. Learned counsel had spoken of the rare and interesting phenomena which this case had presented to the medical profession. It might be that that was so, but they could only take cognizance of the evidence as to the facts which was presented to them. No great amount of help was obtained by considering that the case might be nearly like some other, or comparing it with the case of a sleepwalker. The sleepwalker did something when his mind was completely away, and if in his sleep-walking he fell through a window, and perchance killed someone by his fall, most people, he thought, would hesitate before describing it as murder. But they had to confine their attention to the evidence in the particular case. Lord Dawson seemed to go further in regard to the doctrine of unconsciousness or "unknowingness" than the mental experts, but at the end of his evidence he said that Dr. Lockhart had some appreciation of what he was doing. When the evidence was examined was it possible to say that there was anything like the unconscious act of an unconscious man? The judge referred in particular to the arrangements made for the administration of the anaesthetic and the preparation of the documents which were left for the manservant. Could these be regarded as the acts of an automaton or unconscious individual? There was evidence on which the jury could find, if they thought proper, that at the time he committed the act he was insane or was not responsible for his actions. No one contended that the accused man was insane to-day. Every man was presumed to be sane and to possess a sufficient degree of reason to be responsible for any crime he might commit until the contrary was proved—in other words, a man was not found insane on suspicion. To establish a defence on the ground of insanity it must be clearly proved that at the time of committing the act the accused was labouring under such a degree of mental disorder as not to know the nature and quality of his act, or, knowing it, to be unaware that he was doing wrong. If the jury reached that conclusion the verdict must be "Guilty but insane at the time of committing the act."

The judge dwelt at some length upon the evidence for at least a certain dissociation of ideas. He himself regarded the warning notice as to gas as the most important document in the case. Was there any dissociation of ideas in that? Was that the writing of a man who was an automaton? On reviewing the evidence of the psychologists it seemed a little dangerous that a jury should have put before them on their expert evidence a demand for a verdict of "Not guilty" because of what was said to be unconsciousness or "unknowingness."

The jury were absent for twenty minutes and then returned a verdict of "Guilty but insane." The order of the court was that Dr. Lockhart "be kept in custody as a criminal lunatic in such place as shall be directed until His Majesty's pleasure be known."

EXPECTATION OF LIFE IN WAR TIME

By the Fatal Accidents Act, 1846, if the wage-earner of a family is killed through negligence the widow and children may be awarded damages against the offender. The amount of the damages depends on the pecuniary loss suffered by the household. Mr. Justice Oliver decided in a recent case* that in arriving at the damages it is proper to take into account the possibility of the man being killed in the war. A man aged 31 years was killed in a motor-car accident through negligence. From a chemist's apprentice he had become manager of one of Messrs. Boots' branches, and was in the running for a position that might have brought him a thousand

* Hall *v.* Wilson. 1939, 4 All E.R. 85.

pounds a year. On the other hand, the judge pointed out, the court must consider that he might have been killed in a war, either through fighting in it or through an air raid. The additional war risks applied to his case even though he died before war broke out. Considering also the possibility that the widow might marry again, his Lordship awarded her £2,250, her small son £500, and her daughter £250. Damages in this case were, by agreement, assessed under the 1846 Act, but similar principles would doubtless have been followed if the court had been assessing the deceased's expectation of life under the Law Reform Act, 1934, which allows damages to the estate (not the dependants) of a person who is killed by negligence.

Obituary

P. D. WARBURTON, M.R.C.S., L.R.C.P., D.P.H.

Surgeon, West of England Eye Infirmary

The sudden death on November 9 of Mr. Percival Dillon Warburton at Exeter came as a painful shock to a wide circle of friends both within and outside the medical profession, and his loss will especially be felt in B.M.A. circles in Devon and Cornwall in view of his conspicuous work for the Association for many years.

Born at Retford in 1885, he was educated at Wesley College, Sheffield, and he received his medical education at Sheffield University and later at the London Hospital. He qualified M.R.C.S., L.R.C.P. in 1911, taking the Sheffield D.P.H. in 1914; and at the Royal Infirmary, Sheffield, he successively held the posts of house-physician, house-surgeon, and ophthalmic house-surgeon. He joined the Regular R.A.M.C. in 1913, being seconded to complete the house appointments at Sheffield; and on the outbreak of the last war he reached Belgium in October, 1914, as M.O. to the 1st Battalion, South Staffordshire Regiment, but was afterwards attached to No. 13 General Hospital, Boulogne, as a surgeon. In 1914 he had passed out of the R.A.M.C. College with distinction in pathology and bacteriology. After serving in France and Belgium till 1918 he was early that year sent to India, where he became D.A.D.M.S. with temporary rank of Lieutenant-Colonel, and was also chosen for the appointment of specialist in prevention of diseases at Secunderabad. Retiring from the Army in 1921 he returned to England and came to Exeter, where he immediately engaged in ophthalmic practice. In 1922 he was appointed assistant surgeon to the West of England Eye Infirmary, and in 1932 succeeded Mr. Ransom Pickard as a full surgeon, becoming widely known in this specialty. He also held the surgical registrarship of the Royal Devon and Exeter Hospital, and in 1925 was appointed medical officer in charge of the venereal clinic there.

Warburton was a keen and active member of the B.M.A., which he joined in 1917. In 1925 he became honorary secretary to the South-Western Branch, an office which he was still holding at his death; and in him the Branch loses a quietly efficient and conscientious worker for the Association whose place, especially on the Branch Council, will be hard to fill. He was also a member of the Central Ophthalmic Committee for the eight years preceding the taking over of the functions of that committee by the Ophthalmic Group Committee. Warburton was a man of taste, culture, and wide interests, in fact a man of the world; and he was always ready if necessary to speak his mind honestly and fearlessly, though never with any trace of personal rancour. Being himself of a modest and retiring disposition he particularly resented anything in the nature of what he considered unnecessary display; and in committee, as in affairs in general, he frequently made valuable contributions, thanks to his power of forming sound and intuitive independent assessments of problems and underlying motives. He was a lover of Devonshire and of country life and an enthusiastic sportsman of varied interests: a dry-fly fisherman, a golfer, a keen lawn tennis player fortunate in the possession of a beautiful hard court, and a member of the Tiverton Hunt, of which, usually accompanied by his children, he was an ardent follower for many years. Moreover, in his student days he was a keen soccer player, being a member of the Sheffield Wednesday team in the early years of that club. In 1919 he married, in Bombay, Marjorie, daughter of the late Mr. A. H. Tozer of Theydon Bois, Essex, and of Lloyds, London, who survives him. He also leaves two sons and a daughter, and to the family the deepest sympathy goes out in their sad and premature loss. Popular without ever courting popularity, all who knew Warburton could not fail to note during the last six months how altogether exceptionally deeply the present troubles of his country had affected his personal outlook and philosophy. F. A. R.

F. W. M. CUNNINGHAM, D.S.O., M.D., F.R.C.P.Ed.

Physician, Royal Sussex County Hospital

The sudden death of Dr. Frank Cunningham on November 10 brought a sense of personal sorrow to his many friends, and particularly to the community of the Royal Sussex County Hospital, where in every rank he was held in affection and esteem.

Educated at Glasgow Academy in his early years, he passed on to Fettes College, where he won a foundation scholarship, and thence to Edinburgh University with an open classical exhibition. It was to medicine, however, that he decided to devote himself, influenced perhaps by the advice of his distinguished uncle, Professor Dan Cunningham, who at that time occupied the chair of anatomy in the university. After graduating M.B., B.Ch. in 1907 he became junior house-physician to the late Dr. George Gibson, in whose classes he had won the prizes in clinical and theoretical medicine, and thereafter was medical officer to the Royal Crichton Institution, Dumfries. He then came south and became house-surgeon and house-physician to the Royal Sussex County Hospital, where he formed those strong attachments which in after-years found their fulfilment in an appointment to the honorary medical staff and in a period of fine service which culminated in his becoming senior physician to the hospital. But before this he was to spend some years in the R.A.M.C., first in India and subsequently in the great war in France. He came over as medical officer to Sir James Wilcox's staff, and when the Indian contingent was withdrawn was given the command of the 73rd Field Ambulance with the rank of lieutenant-colonel. In this command he greatly distinguished himself and was awarded the D.S.O. with two mentions in dispatches. During the Armistice he served on the special commission on the reorganization of front area medical work. He retired from the Army in 1919 and started practice in Hove that year. Success quickly followed and he soon became one of the leading and most trusted practitioners in the town. After taking the M.R.C.P.Ed. he was elected in 1921 to the honorary medical staff of the Royal Sussex County Hospital, and later became M.R.C.P.Lond. and F.R.C.P.Ed.

The loss to the hospital he so greatly loved is a heavy one, for he threw himself heart and soul into all its activities, and even in the last year or two, when his former robust health showed some signs of failing, he never ceased to spend himself in its interests. Cunningham took his profession very

seriousiy and it was always his aim to uphold its high tradition. With a wide outlook on life, he was essentially the sound, sagacious, and kindly physician and consultant, intensely concerned with his patients' interests and ever their friend as well as doctor. As an example of his devotion, the writer remembers with lifelong gratitude the many weeks of a life-and-death struggle during which his friend Frank Cunningham gave up his practice, lived in the house and watched over him night and day till all danger was past. Such was the man and such the devotion which earned him the trust and affection of many who now feel forlorn at his passing.

No review, however brief, of Cunningham's life would be complete without mention of his love of all kinds of sport. He was a keen follower of cricket and was a member of the committee of the Sussex County Cricket Club. Seldom, if ever, did he miss a rugger international at Twickenham, and many will miss his cheery presence in the band of friends who used to foregather there on these occasions. He was himself a hockey international player and "blue," a fine golfer, and an enthusiastic fisherman. Frank Cunningham's varied career and numerous interests no less than his straight and friendly character brought him the happiness of many friends, whose first thoughts and deep sympathy will go out to his widow. Him they will remember as one who lived his days generously, simply, and with modesty, as the best always do. H. N. F.

Dr. L. A. PARRY writes: By the death of Francis William Murray Cunningham, Hove has lost a beloved and respected physician, who will be missed by a large circle of colleagues, friends, and patients. He joined the British Medical Association in 1916, and was a member of the Brighton and Sussex Medico-Chirurgical Society, being elected president two years ago, an office the duties of which he carried out with great distinction. Of late years he had, owing to ill-health, given up general practice, with the exception of some of his old patients. He to the last kept on his work at the Royal Sussex County Hospital, to which he was very devoted. A memorial service was held at All Saints, Hove, on November 13, which was attended by a very large number of his medical and other friends. Dr. Cunningham was an essentially honest and straightforward man, loyal in his friendships, hospitable and generous, always available to his colleagues. The profession in Hove know they have lost a loved and distinguished doctor—one whom they all admired and trusted.

Dr. ALEC LANDALE CLARK, who died on November 5 as the result of a road accident, had practised for some years in Gilbert Street, London, W. Son of the late John B. Clark of Broughty Ferry, he studied medicine at Edinburgh University and graduated M.B., Ch.B. in 1923, and then served as clinical assistant and house-physician at the Edinburgh Royal Infirmary. While in practice in Mayfair he worked as clinical assistant at the West London Hospital, the Hospital for Sick Children, Great Ormond Street, and the Hospital for Women, Soho Square. "E. B." writes from Edinburgh: As one who had known Landale Clark from his earliest undergraduate days I would add a few words in memory of one who will be missed by many. "Lal" Clark, as he was known to his intimates, had a host of friends both within and without the profession. His was a very happy disposition; he radiated happiness and he had a kindly thought for everyone. Brought up as a delicate child upon whom every care was lavished, it was interesting to watch the development of his personality. Gifted with a beautiful singing voice and a lover of music, one wondered whether he would take medicine seriously. But any doubts which may have existed were speedily dispelled, for as a house-physician, and indeed throughout his life, his profession and his patients were always, with him, the first consideration. He was a man with high ideals, and his sense of duty dominated his outlook. Lal Clark had a flair for doctoring, for he combined the faculty of picking out the clinical essentials with an unusual depth of understanding and a very genuine charm of manner which gained for him the confidence and the affection of his patients. His partnership with the late Jim Brunton Blaikie in one of the busiest practices in Mayfair was a singularly happy association.

The Services

NAVAL COMPASSIONATE FUND

At the quarterly meeting of the directors of the Naval Medical Compassionate Fund, with Surgeon Vice-Admiral Sir Percival Nicholls, K.C.B., K.H.P., in the chair, the sum of £149 was voted to the applicants whose cases were considered.

"INDIAN MEDICAL SERVICE: A HANDBOOK"

Major A. N. Chopra has published a handbook for the I.M.S., giving all rules and regulations for service therein, which should be most useful to all members, not only to those joining as new recruits, but also to older and more experienced officers.[1] In successive chapters it gives, with appropriate references, the rules for recruitment, conditions of service, courses of instruction, pay, leave, including study leave, travelling allowances, passages to Europe, the Funds, and pensions. Seventeen appendices complete the work, giving the actual text of various Government Orders, the most important of which are No. I, the Royal Warrant of Service, No. XI, conduct rules for all Government servants, and No. XII, dress regulations; also rules for selection for promotion, attendance at senior courses of instruction, procedure when called on to give evidence in courts of law, private practice—all things which it is necessary for an officer to know, but which it is sometimes difficult to find at short notice when reference to authority has been required. It may be said without hesitation that the work is a most useful one, which should be in the possession of every officer of the I.M.S. On page vi is given a list of abbreviations used. Many abbreviations are used in the text which are not included in this list. Fortunately, most of them are easily interpreted. What most strikes a senior whose recollections go back some sixty years is the great rise in advantages—for example, pay on entry, £650, instead of £286; grant of study leave, and of free passages; and the opportunity of retiring on a gratuity after five years' service. On the other hand, the cost of living has considerably increased, and no doubt service in India is not so pleasant as it was half a century ago.

[1] *Indian Medical Service: A Handbook.* 1939. By A. N. Chopra, Major I.M.S. (Pp. 256. Rs. 2, or 3s.) Delhi: Manager of Publications.

Universities and Colleges

UNIVERSITY OF OXFORD

Applications are invited for the Nuffield Professorship of Orthopaedic Surgery, and should reach the Registrar of the University not later than December 16. The stipend is £1,200 per annum and £600 as clinical director of the Wingfield-Morris Hospital; private practice not allowed; age limit 60. Residence is required during forty weeks in each academic year. Further particulars may be obtained from the Registrar.

UNIVERSITY OF LIVERPOOL

The Council of the University of Liverpool, on the recommendation of the Senate, has conferred the title of Professor Emeritus on Sir Robert Kelly, M.D., F.R.C.S., who occupied the chair of surgery from 1922 to September, 1939.

UNIVERSITY OF ABERDEEN

The Senatus Academicus of the University of Aberdeen has decided that students on military service will be allowed, when they return to civil life, to resume any fellowships, scholarships, or bursaries whose tenure may have been interrupted.

UNIVERSITY OF WALES

WELSH NATIONAL SCHOOL OF MEDICINE

The following candidates for the degrees of M.B., B.Ch. have satisfied the examiners at the examination indicated:

MEDICINE.—R. T. Bevan, H. R. Hudd, C. W. D. Lewis, Silvia M. D. Mehta, Enid M. Powell, Llary M. Williams.

Medical Notes in Parliament

In the House of Lords on November 16 the Royal Assent was given to the National Loans Act, the Prices of Goods Act, and the Chartered and Other Bodies (Temporary Provisions) Act.

The Bastardy (Blood Tests) Bill, which was waiting for Committee in the House of Lords, on recommitment, lapsed with the prorogation.

Sir Francis Fremantle presided on November 16 at a meeting of the Parliamentary Medical Committee. Dr. Salter brought forward a report from a medical man who had been transferred from a London hospital to take charge in a home county of a public assistance institution which must prepare 1,600 beds against emergencies. This report made complaints of maladministration and said that questions about supplies had to be referred to the county medical officer, not to the sector officer. On behalf of the Parliamentary Medical Committee Sir Francis Fremantle placed these complaints before Dr. Elliot. It is understood that the Minister made arrangements for a special inspection. The same meeting of the Parliamentary Medical Committee endorsed the approach made to the Air Ministry to secure, with special regard to venereal diseases, the appointment of women medical officers to attend women attached to the Air Force. The Committee also decided to urge the appointment of mobile units to attend scattered units in Britain. It was remarked that local authorities would require assistance in dealing with venereal disease where Service personnel was scattered. A subvention was advocated for the films issued by the Social Hygiene Council. Mention was made of the circulation of anti-vaccination pamphlets among the civil population, and Sir Francis Fremantle's action in challenging this was endorsed. The Committee held that an authoritative contradiction of these pamphlets should be circulated by the Ministry of Health.

Before the Parliamentary Session ended by a prorogation on November 23 the House of Commons discussed unemployment and also the problems of evacuation and education in Scotland. A meeting of the University M.P.s' Committee was arranged for November 22.

E.M.S. and Specialist Services

Sir RALPH GLYN inquired on November 13 whether there was adequate specialist treatment available for persons threatened with blindness and attending Moorfields and other London hospitals, and whether Dr. Elliot would authorize immediate release of enough eye, heart, throat, and ear specialists to attend to their normal peace-time work.

Dr. ELLIOT said he knew no difficulty in providing adequate specialist treatment for ophthalmic cases. In general, there had not been interference with necessary treatment in the other types of case he mentioned. As to the position of specialists, he was discussing with a special committee the terms of service of specialist and other members of the Emergency Medical Service. He hoped to make a statement in the following week on the result of this consultation.

Emergency Powers for Universities

In the House of Commons on November 14 Sir DONALD SOMERVELL moved the second reading of the Chartered and Other Bodies (Temporary Provisions) Bill. The general purpose of the Bill, he said, was to enable modifications to be made in the constitution and electoral procedure of bodies incorporated by Royal Charter, statutory bodies, and universities and colleges, if such modification became necessary to meet war conditions. The Bill followed on the earlier measure dealing with Oxford and Cambridge, and gave the universities power to pass emergency statutes. These would be required to deal with such matters as the postponement of elections to office, the suspension of offices becoming vacant, and the suspension of conditions relating to candidature and tenure of office, scholarships, and so on. The Bill was read a second time.

Education in War Time

Mr. LEES-SMITH opened, on November 16, a debate on education. He said one disastrous result of the present situation was that schemes for milk in schools, medical service, nursing service, dental clinics, and other services had practically come to an end. In the early stages of the war doctors were concentrated in the hospitals and the result was that services outside the hospitals were being starved. Dr. Haden Guest, in an earlier debate on evacuation, had shown that there were enough doctors and nurses available, properly distributed, to provide a nucleus for the hospitals, ready for emergency and at the same time to carry on the public health services, the medical services, and to provide a service of consultants.

Mr. KENNETH LINDSAY, in a general statement, said the average weight of some of the evacuated children had increased by 3½ lb. Many were benefiting from the changed conditions; those in country areas were taller, stronger, better fed, they slept longer, and were more alert and easier to teach. Had there been an evacuation in 1914, 33 per cent. instead of 3 per cent. of girls' heads would have been unclean. In reception areas an adequate medical service was now operating. In neutral areas, wherever schools were opened, there was a normal service. In evacuation areas a skeleton service was operating, and with the reopening of schools it would be extended.

A circular advocating the wider use of communal meals for evacuated children would be issued shortly. The Government had agreed to meet overhead charges, and it should be possible to provide children with a good meal for 2½d. to 4d. Evacuated children who received free milk in their own areas usually continued to receive it in the reception areas. Many of the evacuated children whose parents paid for milk in their own areas also continued to receive it. There had been an inevitable falling off in the consumption of milk by children in the evacuation and some neutral areas where schools were closed pending the completion of air raid precautions. It was estimated that 150,000 children under 5 were now in reception areas, 41,000 of them unaccompanied by parents. Nursery schools of the orthodox type were not possible for them, and it was also felt that crêches and day nurseries would not meet the problem. A scheme for dealing with these children on different lines would be announced. Mr. Lindsay said there were about 900,000 children in evacuation areas, 1,700,000 in neutral areas, and 2,500,000 in reception areas.

Serious Casualties at First-aid Posts

Mr. GROVES asked Dr. Elliot on November 16 whether his attention had been called to the fact that in Barcelona a system of aid posts and mobile units similar to that in this country had to be abolished because it proved impossible to prevent the reception of serious cases at these posts, from which they could not be evacuated to hospitals without fatal delay. He also asked whether the Minister's attention had been drawn to the further fact that the death rate was notably diminished by the abolition of aid posts and mobile units. Dr. ELLIOT said in reply that he had seen statements in the medical press to the effect stated by Mr. Groves. He was advised that the conditions as they existed at Barcelona were not parallel to those in this country. The instructions here were that the seriously injured were to be taken direct to hospitals and not to first-aid posts. He had no reason to believe that these instructions would not be observed. Many first-aid posts in England and Wales were situated at hospitals. First-aid posts were inspected by his medical officers in every region, and he was satisfied the facilities were adequate for dealing with the type of case for which the posts were intended.

Doctors and Gas Masks.—Sir JOHN ANDERSON, on November 14, informed Mr. Bull that he had received one or two representations, and others had been made to the Ministry of Health, from local authorities for civilian duty respirators for midwives and doctors in evacuation districts. He could not undertake to extend the

issue of special respirators and anti-gas equipment to persons outside the public air raid precautions services and the emergency hospital service.

Notes in Brief

The question of allowing an extra ration of butter, when rationed, to tuberculous persons, particularly children, is under consideration.

On October 28 the number of patients on the waiting list for admission to tuberculosis sanatoria and hospitals in Wales was 225, or, including patients discharged by reason of the Emergency Hospital Scheme and awaiting readmission, about 600. Hutted hospitals in Denbigh and at Chepstow are making steady progress, and subject to the requirements of the casualty service will be of assistance in the treatment of tuberculous patients.

Medical News

Professor Grey Turner, M.S., F.R.C.S., has been appointed a corresponding member of the Surgical Society of Buenos Aires and an honorary member of the Society of Hospital Surgeons of Santiago of Chile.

The *Journal of the American Medical Association* for October 28 announces that Dr. Evarts Graham, professor of surgery at Washington University School of Medicine, St. Louis, has been honoured by the creation of a lectureship in his name, and thus Dr. Graham's influence in the advancement of scientific surgery will be prolonged.

The programme of the Royal Institution (21, Albemarle Street, London, W.1) announces a course of three lectures on food production in war time, by Sir Frederick Keeble, F.R.S., on Tuesdays, November 28, December 5 and 12, at 2.30 p.m. The subscription for this course payable by non-members of the Institution is 6s.

The British Institute of Philosophy announces that the second of the series of free public addresses, entitled "The Deeper Causes of the War and the Issues Involved," will be given by Professor Gilbert Murray in the Assembly Hall (entrance in Craven Street, Strand) of the Royal Empire Society at 2 p.m. on Thursday, November 30. The series will be continued in January and February, on dates to be fixed, by Professor Ernest Barker, Sir Richard Gregory, F.R.S., and Sir Richard Livingstone. Cards of admission can be obtained from the Director of Studies at University Hall, 14, Gordon Square, W.C.1.

Professor H. V. A. Briscoe, D.Sc., will read a paper on "The Chemical Properties of Siliceous Industrial Dusts" at the Royal Society of Arts on Wednesday, November 29, at 2.30 p.m. Applications for tickets should be made to the Secretary of the Society, John Street, Adelphi, W.C.2.

The October issue of the *British Journal of Rheumatism* has a note stating that publication of this periodical will be continued, possibly in a restricted form and possibly also at less frequent intervals.

According to *Il Policlinico* (Sez. Prat.) of October 30, of the 38,000 German doctors about a third are with the army, and of the remainder 1,200 have been sent where they are particularly needed, especially Danzig, East Prussia, Kassowitz, and Silesia.

An Order was made on November 9 by the Ministry of Food (Great Westminster House, Horseferry Road, S.W.1) which permits any person to use until further notice the following oils for the purpose of the preparation of any medicine or medicament for internal or external use without the necessity for holding an individual licence as required by Article 8 (*d*) and (*e*) of the Oilseeds, Vegetable Oils and Fats and Marine Oils (Control) Order, 1939: Coconut oil, cotton-seed oil, gingelly (sesame) oil, ground-nut oil, maize oil, olive oil, palm oil, soya-bean oil.

The Library of the Royal Society of Medicine will now be open until 8 p.m., and may later be open until 9 p.m. if there is sufficient demand for this.

EPIDEMIOLOGICAL NOTES

Infectious Diseases for the Week

In England and Wales there was a considerable reduction in the incidence of diphtheria, and small decreases were recorded in Scotland, Eire, and Northern Ireland. With the exception of Northern Ireland, notifications in these countries were well below those of the corresponding week last year, but deaths are slightly in excess (Scotland excepted). There has been little fluctuation in the figures for scarlet fever, and the low case fatality indicates a continuance of the very mild type prevailing in recent years. Dysentery is on the increase both in England and Wales and in Scotland; in the former country no locality is particularly affected, but in the latter more than half the cases, 31 out of 50, occurred in Edinburgh, where there has been an unusual prevalence of the disease during the last six weeks. Though probably unrelated to the dysentery outbreak, the high and increasing death rate in Scotland among children under 2 years of age from enteritis and diarrhoeal diseases is worthy of mention. It may well be that the causative organism is not so readily recovered from fulminating and fatal forms of the disease, and some of the deaths are actually attributable to dysentery.

Acute Poliomyelitis in 1939

During the late summer and autumn, the usual period of seasonal prevalence of poliomyelitis in the northern hemisphere, large epidemics were encountered in various parts of Germany, in Hungary, Switzerland, Holland, and in some of the States of the U.S.A. Except in Hungary and Italy the disease did not reach the 1938 level, but in certain American States it was decidedly more prevalent. In Germany the numbers recorded during the summer and autumn were lower than in 1938, but were well above the median of the immediately preceding eleven years. The majority of the cases were in Schleswig and the Berlin area; of the total 1,130 cases reported between September 3 and 30 in Germany (including Austria and the Sudeten area), 227 (20.3 per cent.) were in the former district and 147 (16.7 per cent.) were in the latter and 40 were in the district of Potsdam. In the previous year Rhenish Prussia, the Palatine, and Württemberg were the principal epidemic foci. In Switzerland the disease was more prevalent during September and October than in the corresponding months of 1938, but the total number was well below the epidemic year 1937. Of the 287 cases reported between September 3 and October 28, 87 occurred in the canton of St. Gall and 66 in that of Aargau, both in the north-east of the country. In 1937 the districts of Berne, Zurich, Vaud, Lucerne, and St. Gall were most affected. In Hungary three-quarters of the cases reported in September and October occurred in the three departments situated along the eastern frontier: of the 331 recorded 68 were in Szabolc department, 44 in Bihar, 91 in Hajdu, and 44 in the town of Debrecen. In the U.S.A. between August 3 and October 7, 3,993 cases were reported, compared with 550 during the corresponding period of 1938 and 5,187 in 1937. Five States contributed about 58 per cent. of the total: New York 717 cases, Pennsylvania 244, Michigan 587, Minnesota 369, and California 374. Outside these States poliomyelitis was less prevalent than usual.

In England and Wales the situation has been more favourable than in 1938, when the disease was unusually prevalent in a few counties, notably in Essex, but never attained epidemic proportions. Between July 1 and November 4, 1939, 473 cases of poliomyelitis were notified and 43 of polio-encephalitis, compared with 1,068 and 77 respectively in 1938. London largely escaped: 64 in 1939 for the same period and 86 in 1938, even although the principal foci in both years were in counties into which Greater London has spread—in Kent to the south of the Thames in 1939 and in Essex to the north in 1938. Sporadic cases and minor outbreaks have occurred in various counties, but in none, apart from Kent, has the disease been able to establish itself. During the current week as many as eleven counties were affected, but only in three did more than one case occur—namely, Kent 5 (1 each in Bexley, Bromley, Gillingham, Maidstone, and Eastry); Surrey 3 (1 each in Leatherhead, Merton and Morden, and Wimbledon); Middlesex 2, both in Harrow.

No. 44

INFECTIOUS DISEASES AND VITAL STATISTICS

We print below a summary of Infectious Diseases and Vital Statistics in the British Isles during the week ended November 4, 1939.

Figures of Principal Notifiable Diseases for the week and those for the corresponding week last year, for : (a) England and Wales (London included). (b) London (administrative county). (c) Scotland. (d) Eire. (e) Northern Ireland.

Figures of Births and Deaths, and of Deaths recorded under each infectious disease, are for : (a) The 126 great towns in England and Wales (including London). (b) London (administrative county). (c) The 16 principal towns in Scotland. (d) The 13 principal towns in Eire. (e) The 10 principal towns in Northern Ireland.

A dash — denotes no cases ; a blank space denotes disease not notifiable or no return available.

Disease	1939					1938 (Corresponding Week)				
	(a)	(b)	(c)	(d)	(e)	(a)	(b)	(c)	(d)	(e)
Cerebrospinal fever	16	—	8	2	1	13	3	7	2	—
Deaths		—	1				—	1		
Diphtheria	883	25	213	49	37	1,457	145	253	88	23
Deaths	22	1	6	8	1	19	2	8	2	—
Dysentery	47	—	50		—	34	9	15		—
Deaths			—	—	—			—	—	—
Encephalitis lethargica, acute	7	—	—	1	—	4	—	2	—	—
Deaths		—	1				—	—		
Enteric (typhoid and paratyphoid) fever	36	—	4	4	5	21	4	2	6	2
Deaths	3	—	—	—	—	1	—	1	—	—
Erysipelas			75	10	8			80	10	7
Deaths		1	2				1	1		
Infective enteritis or diarrhoea under 2 years										
Deaths	23	4	19	5	5	33	12	6	3	5
Measles	175	8	9		12		26	14		1
Deaths	—	—	—	—	—	1	—	—	—	—
Ophthalmia neonatorum	74	6	9		—	82	9	20		—
Deaths										
Pneumonia, influenzal*	534	41	10	2	4	583	75	6	4	5
Deaths (from influenza)	40	4	7	1	2	37	7	1	2	1
Pneumonia, primary			134	15				272	9	
Deaths		7		9	19		19		16	10
Polio-encephalitis, acute	3	—				3	—			
Deaths		—					—			
Poliomyelitis, acute	18	1	1	—	—	70	11	5	—	—
Deaths		—	1				1	—		
Puerperal fever	4	4	11	1	—	5	5	13	3	—
Deaths		—					—			
Puerperal pyrexia	142	6	19		3	155	7	22		5
Deaths										
Relapsing fever	—	—			—	—	—			—
Deaths										
Scarlet fever	1,333	33	214	52	122	2,040	168	403	83	111
Deaths	3	1	—	—	—	—	—	1	—	—
Small-pox	—	—	—		—	—	—	—		—
Deaths		—	—	—	—		—	—	—	—
Typhus fever	—	—	—	—	—	—	—	—	—	—
Deaths			—	—	—			—	—	—
Whooping-cough	143	26	42		3		141	203		9
Deaths	5	1	1	1	—	4	1	1	1	—
Deaths (0-1 year)	255	27	78	15	18	267	40	65	33	23
Infant mortality rate (per 1,000 live births)						44	33			
Deaths (excluding stillbirths)	4,924	769	660	168	134	4,380	841	617	207	144
Annual death rate (per 1,000 persons living)			13.4	11.3	11.8	10.8	10.7	12.6	14.0	12.8
Live births	5,800	691	798	312	239	6,677	1,275	836	257	204
Annual rate per 1,000 persons living			16.2	21.0	21.0	16.4	16.2	17.0	17.4	18.1
Stillbirths	207	18	31			266	36			
Rate per 1,000 total births (including stillborn)			37			38	27			

* Includes primary form in figures for England and Wales, London (administrative county), and Northern Ireland.

Letters, Notes, and Answers

All communications in regard to editorial business should be addressed to THE EDITOR, BRITISH MEDICAL JOURNAL, B.M.A. HOUSE, TAVISTOCK SQUARE, W.C.1.

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The address of the B.M.A. Scottish Office is 7, Drumsheugh Gardens, Edinburgh (telegrams: *Associate, Edinburgh;* telephone 24361 Edinburgh), and of the Office of the Cumann Doctúirí na h-Éireann (I.M.A. and B.M.A.), 95, Merrion Square, W., Dublin (telephone 62550 Dublin).

QUERIES AND ANSWERS

A Historic X-ray Apparatus

Dr. R. T. GUNTHER, Curator of the Museum of the History of Science, Old Ashmolean, Oxford, announced in the *Times* of November 10 that his museum had lately received a portable *x*-ray apparatus of outstanding historic importance, for it was probably the first outfit of the kind to be placed at the disposal of army surgeons in war. In 1898 Captain E. G. Spencer-Churchill, then an undergraduate at Magdalen College, acquired a Wimshurst electrical machine, *x*-ray tube, and fluorescent screen, with which he showed his friends the bones in their hands. When, in 1900, he went out to serve in the South African War his *x*-ray equipment went out too, and was the only one then available in South Africa. Dr. Gunther would like to know from our readers whether there is any army record of an earlier *x*-ray apparatus being used in military surgery.

Fractured Femur in the Field

Dr. BERNARD CHAVASSE writes from Liverpool: The method of treatment referred to by your correspondents Dr. W. R. Wilson (*B.M.J.*, October 28, p. 896) and "D. W." (*B.M.J.*, November 18, p. 1028), who alludes to the description of it by Major J. B. Fotheringham (*Journal of the Royal Army Medical Corps*, March, 1939), is that which appeared under my name in your issue of October 5, 1918. I feel honoured that this method, which was slowly evolved under the conditions for which it was designed, has met with such distinguished and recent approval. The method is not a rival to the Thomas or any other proper splint. It is for application at the site of the casualty—separated from the regimental aid post (where a Thomas splint may be available) by what is apt to be a terribly long and rough journey. Only a stretcher and two stretcher slings are required. The rifle gives additional support.

Hygiene of Rubber Boots

"M.R.C.S." writes with reference to the inquiry by "Registered Medical Auxiliary" about a foot powder for soldiers wearing rubber Wellingtons: For the last forty years I have used rubber boots for all my shooting and fishing (except when wading). Blistering is prevented by making the feet a close fit in the boot by wearing two pairs of socks, or a pair of socks over stockings. This seems to prevent the feet getting over-hot in hot weather, and keeps them much warmer in cold. I also use an inner sole cut out of a thin sheet of cork. This sole can be taken out and dried after use. Of course the socks should be changed and dried—at any rate the outer pair, which seem to absorb most of the moisture. The boots need drying inside as far as possible. No doubt these precautions could not be taken in the field, but some form of inner sole and an extra pair of socks should do away with most of the risk of discomfort or injury to the feet. Any powder would probably form a cake with the sweat.

Obesity after Childbirth

"G. W. G." writes: Can any reader give me advice regarding a woman patient aged 30, who weighs nearly 16 st. (height 5 ft. 6 in.)? One year ago she had a child, and since that event has put on 1½ st. The breasts are still full of milk, although the child has been weaned for ten months. She eats moderately and avoids most fattening foods. Apart from getting somewhat easily tired and being very worried about her figure she enjoys good health.

Muscular Twitchings

"H." writes: Can any of your readers suggest a treatment likely to control general twitching of the muscles—sometimes affecting all the muscles of the body? Calcium and parathyroid, luminal, and chloretone have been tried without effect. The patient is 80 years old.

Income Tax

Husband and Wife

"DELTA" has been called up for military service, and his wife, who is in the A.T.S., has also been called up, and is stationed some distance away. Can he claim that they are legally separated so far as income tax liability is concerned?

*** No. The precise point has not been before the courts, but the general argument in Eadie *v.* Commissioners of Inland Revenue—that absence by reason of duty, business, pleasure, etc., does not constitute separation—would be against the claim. "Delta" is, however, entitled to the additional personal allowance in respect of his wife's earnings—£45 for 1939–40.

Division of Partnership Assessment

X. took Y. into partnership on a 50 per cent. basis as from April 1, 1939, and the firm's assessment for 1939–40 was based on the amount of X.'s (sole) practice for 1938–9. Consequently his car expenses—£305—for that year were deducted in calculating the assessment, but, of course, no expenses were deducted on Y.'s account—he was not then in partnership. How should the assessment of £*x* be divided between X. and Y.?

*** There is no legal rule that covers the facts, and the partners evidently only want an equitable basis for division. Our suggestion is as follows. Compute the amount of expenses Y. will incur corresponding to X.'s £305—we will suppose it is £150—then add both amounts to £*x* and divide equally before taking off the expenses. The results will be: X.'s share, 1/2 of (£*x* + £455) less £305; and Y.'s share, 1/2 of (£*x* + £455) less £150. Unless Y.'s estimated expenses are taken into account in this way he will pay on more and X. on less than fairness suggests.

LETTERS, NOTES, ETC.

"Foreign Pharmaceutical Products"

Messrs. BALLANTYNE, CLIFFORD AND CO., Solicitors, 120, Fenchurch Street, E.C.3, write: We have been instructed by our clients, Messrs. H. R. Napp Limited of 3 and 4, Clements Inn, W.C.2, to write you with reference to the publication in your *Journal* of the booklet issued by the Association of British Chemical Manufacturers and the subsequent references to the same appearing in your issues of November 4 and 11. Our clients do not feel that the matter has been dealt with satisfactorily so far as they are concerned, although they are glad to note and appreciate your expression of regret for having published material which may infringe the registered trade names mentioned in the booklet. They desire us, however, to call your attention to certain matters which have not been specifically mentioned and without knowledge as to which, they feel, there is danger of your readers forming an erroneous view both with regard to them and the products. We refer to the fact that not only are these products manufactured by our clients in this country but that they have been so since their inception several years ago, and that they are and always have been marketed in cartons upon which is clearly indicated that they are made in England. Our clients feel sure that you would wish to prevent as far as possible any injustice to them arising from this unfortunate publication, and they hope you will insert this letter.

Corrigendum

The designation of Dr. John Sainsbury was incorrectly given under his signature at the end of the letter on "A Drop-wrist Splint" published last week at page 1021. It should have read "Late Medical Officer in charge Massage and Electrical Department, Special Surgical Military Hospital, Ducane Road."